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September, 1932

Contents

Foot-and-Mouth Disease Control....368
Azamine—A New Antiseptic....372
Observations on Bang's Disease....374
Anti-Fowl-Pox Vaccination....379
Anti-Sterility Treatment of Cows....380
Ingredients of Live Stock Remedies....384
Renal Function of Dogs....389
Indian Veterinary Practice....391
Tetanus Antitoxin in Meningitis....392
Reports of Various Clinical Cases....394
Ballard's Snow Liniment....396
Unusual Equine Hermaphrodite....397
Common Disease of Range Sheep....398
Common Poultry Diseases....402
Method for Turning Fetal Calf....405
Bent Ear in German Shepherd....405
Evolution of Veterinary Instruments....406
Causes of Mortality in Poultry....406
Veterinary Obstetrics and Zootechnics....408
History of Veterinary Literature....409
Manual of External Parasites....410

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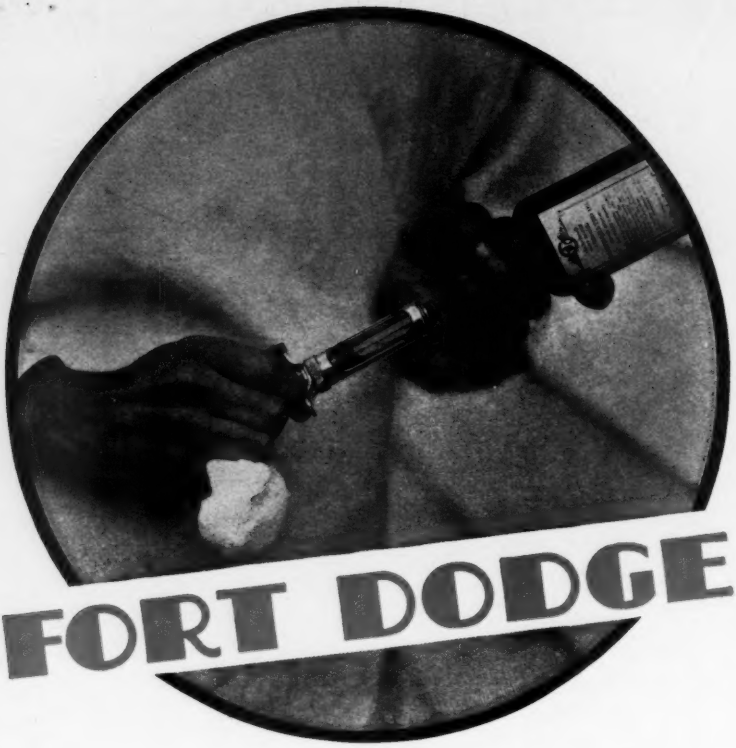

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D. M. Campbell, Editor A. T. Kinsley, Associate Editor

The greater the number of animals kept upon a given area and particularly if they are over-crowded, the greater the danger of infectious and parasitic diseases.

Well nourished animals are strong and therefore more capable of resisting disease. A proper diet is therefore the first essential in the economic production of live stock.

Muttermilch and Salamon advocate subdural inoculation of antitoxin in the treatment of tetanus in man. The method is probably equally adaptable to the treatment of tetanus in horses.

Dalling in reporting on the immunization of more than 1,000 hounds against canine distemper, finds that the vaccine followed by dried virus is at least 99 per cent effective as an immunizing method.

Snyman reported thirteen abortions attributed to *Vibrio fetus* in a herd of 160 dairy animals in South Africa. All animals in the herd were negative to routine agglutination test for *Br. abortus* infection.

Rosell believed from the examination of nearly 2700 samples of milk, that 98 per cent of the cases of mastitis in high-productive herds are of the chronic streptococcic strain and considers that it occasions a greater degree of loss than any other cattle disease.

Ninni and Monaldi conclude from experiments that BCG confers on guinea pigs an immunity to subsequent inoculation with *B. anthracis,* but that the immunity is not evident until 28 days after inoculation.

In attempting to control an outbreak of an infective disease the apparently healthy animals should be removed from the infected lots, sheds and barns and the affected individuals should be left on the infected area thus protecting the healthy animals and preventing the spread of the infection.

Census figures show that in 1925, work animals furnished 61 per cent of the power used on farms in this country. In 1931, gasoline and electricity supplied 52 per cent of the power used on the farms. A survey in Illinois in the spring of 1932 showed horses and tractors furnishing approximately equal portions of the power used in field work.

Zwick, as a result of a very large number of observations made in Germany and elsewhere, concludes that although hygienic measures must never be disregarded, the eradication of Bang's disease by that means is not economically possible except in suitable and slightly infected herds. Vaccination with living culture vaccine is to be recommended and entails no great danger to human beings, according to Zwick.

The annual per capita consumption of dairy products in the United States has increased from 836 to 1032 pounds in the last 10 years.

Omaha, Neb., is the largest butter manufacturing city in the world. Its average annual production is 35,000,000 pounds.

There are about 8,305,000,000 gallons of milk and 1,500,000,000 pounds of butter besides evaporated milk and cheese as well as other by-products distributed by 3,785 major dealers with organized branches and delivery systems. About 20 per cent of the consumers' food dollar goes for milk and milk products. There is about 60,000,000,000 pounds of whole milk sold annually in the form of fluid milk and cream.

In 1931 there were 22,975,000 milk cows on farms in the United States, representing an average production for each cow annually of between 4,500 and 5,000 pounds, or between 562 and 625 gallons of milk. Each cow represents an average value of $90.05 a head.

Bovine coccidiosis occurs in all seasons and is apparently equally prevalent in dry and wet climates. It is generally conceded that many cattle harbor coccidia but show no clinical evidence. According to Wilson of Virginia, the oocysts may be incubated successfully in a 2% solution of copper sulphate. Others are of the opinion that copper sulphate, one dram to each 500 pounds weight, is efficient treatment.

Infectious bronchitis, (laryngo-tracheitis), a fatal disease of chickens, is caused by a filterable virus which according to recent investigations may be transplanted to the cloacal tissue. Fowls in which cloacal inoculation has been successful possess a degree of immunity against bronchial infection. Immunization by cloacal inoculation may be possible, as the cloacal infection is not fatal, however, the possibility of carriers should be given consideration.

According to a recent report in the Journal of Clinical Investigation, the most malignant tumors have a relatively high percentage of fat. The exact relation of fat content and malignancy has not been ascertained.

Carbozoo is the name given to a new anthrax preventive (see VETERINARY MEDICINE for June, 1932, page 251) that has been used on a large scale in Italy with results that are said to be entirely satisfactory. Carbozoo is a suspension of fully virulent living anthrax bacilli and spores in a 10 per cent saponin. The action of the vaccine appears to depend upon the reaction produced in the body by the subcutaneous injection of saponin. A marked local reaction occurs which acts as a defensive barrier. The bacilli retain their vitality and virulence and antigenic powers.—*Vet. Bul.*

Deich states that by using a specially prepared tuberculin in the form of an ointment, an ophthalmic test may be made in which there is a quantitative relationship between the intensity of the reaction and the character of the tuberculous infection. It may be worth stating here that some of those who have used the intradermal tuberculin test extensively claim that there is a relationship between the reaction to this test and the character of the infection and that they can unfailingly pick out the no-lesion cases by the type of reaction.

Hadley, by frequent testing of a herd over a period of two years, found that a relatively large number of high titre reactors to the agglutination test for Bang's disease developed into low titre reactors and a small number overcame the infection. All cows that began with low titre reaction eventually became non-reactors. In view of these observations, he advises that cows which react to the agglutination test during the height of an abortion storm be not immediately removed from the herd, but that the testing be continued over a period of months and that only those animals be disposed of which continue to give a positive reaction.

Kristensen concludes from a consideration of 1317 cases of undulant fever, that 40 per cent were due to infection by milk and 60 per cent to contact infection from other sources.

Fraas reports the infection of a veterinarian during the administration of live organism vaccine for the prevention of Bang's disease. Pyrexia and sweats occurred each night during a period of three months. His serum agglutinated *Br. abortus* at 1:800. After four months he was able to resume his practice but a mild relapse occurred six months later.

Recently, advocates of raw (unpasteurized) milk have been claiming that heated milk lacks some of the growth-promoting properties present in raw milk. A survey of over 3,000 children in the two-to-six-year age group made by the U. S. Public Health service, disproves these claims and in addition showed that the children in the survey getting predominantly raw milk had more diphtheria, more scarlet fever, more intestinal disturbances and more rickets than children getting predominantly heated milk.

A study of the history of medicine reveals many important discoveries that are of value in the diagnosis of disease. The improvement of the microscope, the perfection of an artificial culture media, and the discovery of agglutinins, preciptins and related substances in blood serum have simplified the identification of microbian diseases and rendered possible the differentiation of closely related ailments. Chemical pathology, the outgrowth of physiologic chemistry has revealed many important facts that are of value in diagnosis. Urinalysis is an every day routine in all up to date clinical laboratories. Recently the chemical analysis of blood has been found to be of value in certain cases and no doubt chemical pathology will be found applicable in many other ways as an adjuvant in diagnosis. Medicine is truly a progressive science and it is not possible to predict the future achievements but it is certain that only the persistent student will be up to date five or ten years hence.

Heating milk in the process of pasteurizing it to make it free from germs, does not affect its nutritive qualities for children from two to six years.—U. S. Public Health Service.

The early diagnosis of cancer by a serum reaction discovered by Fuchs of Berlin has been announced, according to the discoverer fibrin in the blood of a non-cancerous patient is broken down or digested by the blood from a cancerous patient. Although special apparatus and special training is required in making the test it may be perfected so that it can be more generally used.—*Science.*

Victor K. LaMer of Columbia University, concludes as a result of experiments on rats, that if the proper amounts of calcium and phosphorus are included in the diet, the length of the average life of man could be extended 10 per cent by this means alone. That is to say, those who would normally die at 70, would live to be 77. By building strong calcified bone, such as results from a high intake of calcium and phosphorus in the diet, the prime of life also can be prolonged. Although important, vitamine D and ultra violet light cannot substitute for the proper amounts of calcium and phosphorus in the diet.

Parasitism is an important economic factor in animal husbandry. The loss due to retarded growth and development incident to parasitisms is enormous. The age-old question is, is unthriftiness, emaciation and retarded development in animals infested with parasites due to the parasites or has improper care and insufficient nourishment produced unthriftiness, diminished the animal's resistance and thus provided a favorable field for parasites? Foster and Cort have reported an experiment in *Science* in which there was a definite correlation between under-nourishment and susceptibility to hookworms in 13 dogs.

The Hoof and Mouth Disease and its Control in Germany*

By DR. JOSEPH WIEMAN, Berlin, Germany
Secretary of Agriculture in the Prussian Cabinet

THE control of the hoof and mouth disease is the most important and certainly the most difficult task of the German veterinary service.

In many countries, in which the cattle raising is less intensive, and where the average value of the cattle is comparatively low, the control of the hoof and mouth disease is not considered to be very important. The cattle suffering from it usually recover, without causing considerable loss to the owner. It is not imperative, therefore, in those countries, to go to any great expense on account of this epizootic. However, in countries, in which cattle raising is as intensive as in ours, where through many years of proper selection and feeding cattle raising was brought to its highest level of development, an epizootic of hoof and mouth disease usually means *the total loss of the entire year's profit.* We have to consider not only the direct loss from death, but also the indirect loss from lowered production. In Germany the latter means a seven times larger loss than the direct loss from death. The total loss of the big epizootic in 1920 was estimated at 425 million gold marks.

In Germany these losses are so much more important, because in a very large part of the country the farmer's only income is from cattle raising. Besides 75% of the cattle raising is done by farmers of small means. The situation is still more complicated by the fact that the German farmer does not have any reserve capital at his disposal. He is using a great deal of credit in his business. Besides, he is compelled to carry considerable burdens, tributes, etc. which he can pay only from his yearly income. A single year without income means such a tremendous loss to him, that he can make up for it, only through many years of hard labor, if at all.

Germany, therefore, cannot afford, as some of the other countries with less intensive cattle raising industries, to let the epizootic either partly or entirely take its natural course, but is compelled to combat it with every available means at its disposal, so that its cattle production may not suffer an interruption.

The natural conclusion therefore would be, that Germany would do everything possible, by destroying the infected cattle in the most drastic manner, to eradicate this epizootic once for all. Actually, the German law on epizootics prescribes this method of combatting hoof and mouth disease. But facts are stronger than theories, even the pet theories of the German law makers. If they should try to apply this method, even under the most favorable circumstances, the damage resulting would be incomparatively greater than the expected benefit. On account of the present economic and political chaos the German government would be utterly unable to raise the necessary amount to compensate the individual owners of the infected and destroyed cattle. Besides the comparatively high actual cash value of the cattle we have to consider also the still bigger potential loss of the highly selective stock value, which could hardly ever be replaced. Besides, this method would not solve the problem as long as all the neighboring states do not adopt and strictly enforce a similar method. Otherwise the disease would be constantly renewed and brought in from every surrounding country.

The destruction of the infected cattle cannot be considered as the only weapon in our fight against hoof and mouth disease. But this consideration does not prevent us from applying it, in individual and isolated cases, in territories not yet infected. But when larger epizootics occur, Germany is com-

*Translation by Alex Schreiber, Houston, Texas. Concurrent publication arranged with the *Tierärztliche Rundschau.*

pelled to isolate and quarantine the territories infected and to keep the infection from spreading. This is done through a very strict quarantine system which has for its purpose the thorough control of all avenues of communications through which the disease may spread.

In order to better understand the German quarantine method I wish to give a short resume of our theory as well as the actual feasibility of the extension of the epizootic.

The first and most thorough consideration is given to the fact, that the hoof and mouth disease, more than any other similar disease, is highly pandemic. Occasionally it develops a very high velocity and then it spreads in tremendous waves over half Europe, irrespective of the various political or economical divisions of this continent. Then again for many years it is more or less endemic, and does not cause a great deal of trouble to those who try to combat it. I have clearly pointed out in another article, that the hoof and mouth disease, in the last 40 years in Germany has assumed the proportions of a big epizootic about once every 10 years; in the year 1892 (185,929 farms), 1899 (162,657), 1911 (245,646), and 1920 (746,571). A new outbreak occured in 1929/30. This outbreak, however, reached only 34,148 farms in 1930, and we consider it was limited to this comparatively small number as a result of the new protective methods, to be described in the following paragraphs.

In judging the effects of the protective measures the character of the epizootic is a deciding factor. But it is very hard to know in advance, whether one has to deal with a big or a small outbreak. A certain inference can be derived from the percentage of mortality. Though the mortality does not always keep pace with the tenacity of the disease, yet we can adopt it for a fact, that a very virulent type usually is characterized by a very high mortality. The mortality in Germany varies in average between 0.5% and 2%. The biggest epizootic in the last decade was the one in 1920. In this year the mortality reached in certain localities a terrifying figure. But the average figure was 2%. In the province of Schleswig-Holstein it reached 3%. In Würtemberg the mortality in certain villages was 75%!

When effecting the protective measures, naturally we assume in each case, that we are to deal with a big epizootic. The character of the disease, therefore, does not influence our action, but should always be considered when we evaluate the results achieved. In this respect we cannot overemphasize the importance of proper criticism. We can easily obtain satisfactory results, when the outbreak is of a type that is not very virulent. I myself have seen outbreaks, when the disease would not spread even after direct contact, or in which only a few of the stable mates were sick. Such cases are apt to happen at a time when the epizootic has just about run its course. These cases can be brought under control easily, only too easily through our protective measures. Dangerous epizootics, however, are indicated by the fact that it spreads not only very easily through direct contact, but even more disastrously through carriers, especially human carriers. The more an outbreak looses its tenacity, the less is it apt to be spread through carriers, and naturally isolation measures become just so much more effective. We know, that at the beginning of a new outbreak of very great velocity, infection cannot be prevented even by the most ruthless measures; while at the end of the epizootic the same measures are very effective.

Considering it from this angle, we can make the following observations concerning the measures used in Germany:

The main object of the preventive measures against hoof and mouth disease is to combat its velocity and its size, i. e. its extension. In Germany the area involved in an epizootic is greatly increased on account of the active cattle trade; the constant shipping of cattle to distributing points and markets, to cattle shows, cattle auctions and slaughter houses; and on account of the large size of many of our dairies. If we could effectively prevent the constant shipping of cattle and prevent their aggregation in large numbers, an outbreak in Germany would have only a small, local significance.

On account of the wide territorial distribution of the milk and meat industries the marketing and shipping of cattle requires a very complicated system of transportation. The spread of the disease acquires a very great velocity whenever it appears in shipping and distributing points. We therefore are not content with a mere veterinary control of the market and shipping places but we also attempt effectively to control and direct the cattle trade. Cattle designed for the slaughter houses are shipped in the quickest possible way to their destination. Under no circumstances is it permitted to return them to the stables from which they were shipped. We also segregate shipments to the slaughterhouses from all other shipments. They are specially branded. Cattle cannot be shipped from the slaughterhouses to the market and they must be slaughtered within four days of their arrival.

Since the strict application of these drastic rules the slaughterhouses of Germany do not increase the number of cases appreciably.

In the market places for stock cattle, however, matters are not so simple. The entire cattle trade could be made harmless, if one could keep the cattle immune while going through the channels of trade. To achieve this purpose, we have had only one weapon at our disposal so far, the vaccination with Löffler's serum. The period of effective immunization is only 14 days, but this period is usually long enough to transport the cattle to their final destination. It is regretted that this method seems to be too expensive for our people at the present time. The cattle market cannot carry this additional burden. But at least, we have achieved the goal with the assistance of substantial state funds, that all cattle shows and cattle auctions within designated boundaries are now subjected to compulsory immunization, and these places have ceased to be focal points of infection. This very fact proves that it is possible to stop the spread of the epizootic in all the channels of the cattle trade, but, as stated in the foregoing, we are unable to afford the cost of general compulsory immunization. We therefore are restricted to the use of great vigilance in observing and directing our cattle trade.

Foot lesions of Foot-and-Mouth Disease

The large dairies and associations have only a local significance. We have mostly small farms in Germany and therefore the large dairies are few and easily controlled. We do have quite a number of dairy associations, whose activities extend over a large territory and who obtain milk from thousands of individual farms. Almost all of these associations use the milk for the production of butter and cheese and return the residue to the farmers for feeding purposes. It is obvious, that if this returned skimmed milk or whey is infected, the disease will be spread rapidly over a large area.

Luckily, there is a simple way to stop the spread of the epizootic through these channels. That is the compulsory boiling of the returned milk and the compulsory disinfection of the containers. If, in spite of these regulations, the disease is still being spread through this channel, it is because these regulations, either through criminal neglect or technical reasons, are not being observed strictly. There is a methodical and well-planned state control system in effect to supervise the observance of these regulations and without question it has had a great deal of success. The spread of the epizootic from dairy associations has appreciably decreased in the last decade and the reliability of the boiling and disinfecting system is steadily rising.

After excluding the three most important points of the spread of the disease (slaughter houses, market places and creameries and cheese factories) we have to deal only with local cases and measures to prevent the spread from an infected farm. The necessary measures are obvious. It consists of an absolute quarantine of the infected places. This quarantine extends not only to the infected farm, but includes all those surrounding farms too, which might have been infected. We in Germany therefore, in each case of a virulent epizootic designate a certain quarantined territory including all places where the disease may be dormant. Within this territory all farms are closed to any kind of cattle movement, as long as the epizootic persists in the infected places.

Yet, in spite of these measures, the spread of the disease from the infected and quarantined territory cannot always be localized —especially where it is spread through human carriers. In order to combat this, we instituted, a few years ago, compulsory immunization with excellent results. We enforce this law for the duration of the epizootic over all the quarantined communities and farms. We endeavor, through simultaneous vaccination to shorten the duration of the quarantine. With these measures we have invariably very successfully localized and immediately extinguished the outbreak. Through very closely observed experiments we have established the fact, that in the isolated villages only one or at the utmost two farms became infected. For particulars see Müssemeir's report at the international conference on epizootics.

The movement of human carriers, however, cannot be stopped effectively, even in case of a virulent outbreak. As a result we have constant outbreaks of isolated cases which are carried beyond the boundaries of the existing quarantine territories. But these cases are not very numerous and can be surrounded easily by a new quarantine.

It is regretted greatly, that in case of a large epizootic universal, compulsory immunization cannot be enforced on account of the expense. This is especially true today on account of the unsettled economic conditions. In order to immunize quickly and effectively, the entire expense must be borne by the state. The secretary of agriculture of Prussia was compelled to curtail these vaccinations greatly in August, 1931, and as a result the epizootic spread appreciably in the following months. If we have been successful in combating its spread during last winter, this happened most likely, because we were at the end of an outbreak period, and therefore its virulence was most likely on the wane. But there is no doubt about the fact, that because we have aided the other preventive measures with a compulsory, universal immunization, the epizootic in 1929/1930 was diminished greatly. We can point to the fact, that the number of the infected farms in Prussia was only 10% of those infected during the big outbreak in 1920 and that the spread was slower.

We in Germany are well aware of the fact, that the immunization in its present form is only an emergency measure. But we are convinced, that in countries which cannot combat the spread of the hoof and mouth disease by destroying the infected cattle, the application of immunization is a strong and useful weapon against this epidemic. The next and most important task of veterinary science is to improve the technique of this immunization. It is imperative to find a suitable, active immunization method, whereby the cost can be lowered materially and the immunization period at the same time extended. Through the simultaneous application of such an immunization in connection with effective quarantine measures it should be possible to eradicate disease from all Europe without destroying the affected cattle.

Tongue lesions of Foot-and-Mouth Disease

A Preliminary Report on a New Antiseptic Dye, and Its Chemo-Therapeutic Uses

By J. N. FROST, Ithaca, New York
Department of Surgery and Large Animal Clinic. N. Y. State Veterinary College

THERE has been placed on the market recently a new antiseptic called azamine. It is an azo dye of the pyridine series; chemically tolyl-azo-diamino-pyridine hydrochloride and occurs as a fine, brick red, micro-crystalline powder; slightly soluble in cold water; soluble in hot water, glacial acetic acid, and glycerine. It is insoluble in dry ether, acetone, benzene, and mineral oil. Azamine is very stable in dry form.

Azamine is a chemo-therapeutic agent proposed for use as an antiseptic for the urinary tract; injection into the teat canal, and for intravenous and oral administration. It is eliminated rapidly through the urine, which it colors an orange or deep amber. Its presence in the urine, even in small quantities, can be detected by adding a few drops of hydrochloric acid, which will change the color to deep red. The radicals present with pyridine in the "azamine" molecule increase the germicidal properties and lower the toxicity.

Azamine penetrates rapidly through denuded surfaces and mucous membranes. When fed orally the characteristic orange or deep amber color appears in the urine in about two hours.

The dose recommended for the horse and for the cow is one 5-gram capsule (80 grains), two or three times daily per os, and for the dog, 5 to 10 grains. 250cc of a 0.5% solution is given the horse or cow intravenously and 50cc for a young calf. We have given the horse and the cow each 1,000cc intravenously and the only effect, which it produced, was a slight increase in salivation and defecation; the feces being slightly softened, probably due to increased secretion of the intestinal glands. Orally, we have given 800 grains daily to the cow without any bad effect. Externally, we have used it in a 0.5% solution as a dressing for wounds, as it is non-irritating.

One of the first cases in which we used it as a treatment was a wound on the leg of a horse. The wound extended from above the carpus to the fetlock on the posterior side of the leg. The edges of the wound were shaved and the surface sprayed with 0.5% azamine, covered with gauze and cotton and left in place for two days. The owner changed the dressing every other day. The wound healed with very little suppuration and left a scar that was barely visible. In all we have used it on ninety-four wounds, five cases of poll-evil and twelve fistulous withers.

In twenty cases with a vesicular vaginitis we used 2½ grams to one pint of oil and injected two ounces into the vagina and smeared it over the vulva. We inserted 2½ gram capsules in ten cases of retained placenta in which the membranes were not removed, and in five cases following the removal of the membranes. In five cases of retained placenta we used 2½ grams to a pint of oil without removing the placenta, and in six cases it was used after the removal of the membranes. In all cases of metritis the results were highly satisfactory.

In twelve cases of influenza and five cases of purpura we injected 250cc intravenously and found that it reduced the fever and hastened recovery. In some cases the injection was repeated on the third or fourth day. It has been very helpful in the treatment of coccidiosis, especially in young calves where death is usually due to secondary infection. We gave injections of 50cc to young calves and repeated it the fourth or fifth day and were successful in

preventing pneumonia and other secondary infections, which usually follow coccidiosis in the young. The older animals were given one or two 5-gram capsules a day with good results. We have treated in all 128 animals affected with coccidiosis.

In treating mastitis we have used it orally, intravenously, and by injection into the udder through the teat canal. By selecting the cases and by treating those which had developed the disease recently and showed clots on the strip cup, it has given good results. In using it as an injection into the udder it should be made up with distilled water or it may prove irritating. It should be allowed to remain in the quarter a sufficient length of time for the aqueous suspension of Azamine to be absorbed and exert a definite bactericidal action on the infecting organisms present. The state of the inflammation will, of course, govern the length of time the aqueous suspension of Azamine should remain in the quarter. In the acute form, due to the excessive inflammation, a smaller amount will be absorbed than in a chronic or sub-clinical case. In the former it was necessary to milk out the amount injected into the teat canal within two to three hours after the injection and then repeat the process. In chronic cases the injection should remain in the udder 8 to 10 hours.

The first cow in which we used azamine for mastitis was treated over two years ago. She is still milking and does not show any reaction to the thybromol or chlorine tests, or to laboratory plating. She was fresh, when treated, and has freshened once since. Three quarters were infected only slightly and cleared up by feeding two capsules of 2½ grams each, twice daily. The fourth quarter, more severely infected, was given an injection of 300cc of a 0.5% solution in distilled water and the injection repeated on the third day. The solution was left in the quarter over night and the treatment was followed by frequent milkings the next day. Cold applications also were applied to the udder by means of a suspensory bandage. In one herd, three cows that showed clots in the strip cup, reacted to the thybromol and chlorine tests and were determined to be infected with hemolytic streptococcus were treated with one injection of 250cc in the udder. This was permitted to remain in the udder over night, or about fourteen hours, and followed by frequent milking the next day. They were also given orally one capsule, five grams, daily for four days. These cows have been examined daily with the strip cup, and have shown no clots. Three veterinarians have examined the cows and pronounced them healthy. Thybromol and chlorine tests monthly have failed to show any reaction and blood agar plates are sterile.

Two cases of cystitis in the horse were cleared up rapidly by the use of two 5-gram capsules daily in the feed.

An examination of the blood following the injection of 250cc into the jugular vein failed to show any change in any of the constituents of the blood in either the horse or the cow.

Conclusion

Azamine is an antiseptic of high bactericidal power and is non-toxic and non-irritating. It possesses the ability to penetrate deeply into the tissues. This clinical report is offered in the belief that we have in azamine a most valuable addition to the treatment of mastitis, vesicular vaginitis, metritis, influenza and coccidiosis.

Weighing for slaughter—Municipal horse abattoir, Paris, France

Observations on Bang's Disease

By E. K. GLOVER, Kansas City, Missouri

Herd No. 1

This herd was started on a program of yearly treatment with abortion vaccine live organisms administered sixty days before breeding. The writer did not see this herd until October, 1929, when blood samples were obtained, test made and herd history obtained. This was about twenty-one months after initial treatments were started.

Abortion rate before treatment was started 70%
Abortion rate through period of 21 months 11%
Agglutination reactions—
20 head treated animals, positive...100%
6 head untreated open heifers, negative 100%
1 untreated bred heifer, positive..100%

Herd No. 2

This herd was assembled as a one hundred per cent negative herd as determined by duplicate testing by two reliable laboratories. Final additions to herd were received in May and abortions started in June within thirty days after assembly was completed. This herd consisted of bred cows and open heifers. They had been purchased from numerous herds of pure-bred Jerseys, were placed on clean ground and in newly constructed barns and corrals which never had been used for livestock of any kind.

This is without doubt one of many such cases where infected animals (with no resistance whatever and soon to abort), giving negative reactions, were associated with susceptible non-infected animals and contaminated an entire herd.

In this herd from May to December, the calves lost by abortions were 67%; animals reacting to agglutination test December 1st, 38%. Average titre of reacting animals, 1-200.

On December 6th, 1929, the open animals were treated with abortion vaccine and the pregnant ones were treated with anti-abortion serum and abortion vaccine simultaneously.

Agglutination tests started December 20th, 1929, and were repeated at thirty day intervals for one hundred and ninety days; last test being made June 20th, 1929. The herd was 100% positive in dilution, 1-100 at ten day period after treatment. Following is an abreviation of the complete record and gives some interesting figures on titre on entire herd also differences as regards, pregnant and non-pregnant, mature and immature animals.

Average titre herd—
40 days after treatment.....1-2810.6
70 days after treatment.....1-2814.0
100 days after treatment.....1-2491.27
130 days after treatment.....1-1693.12
160 days after treatment.....1-1522.00
190 days after treatment.....1-1194.18
Minimum titre in herd—
Open heifer, on tenth day....1-50
Maximum titre in herd—
Open cow, 70th day.....1-40000

Analysis of herd titre over period of 190 days:

12 open heifers, negative reactions—
40 days, 4 head ..... 33.3 %
70 days, 5 head ..... 41.6 %
100 days, 5 head ..... 41.6 %
130 days, 12 head .....100. %
5 bred heifers, negative reactions—
40 days, 2 head ..... 40. %
130 days, 2 head ..... 40. %
190 days, 2 head ..... 40. %
12 open cows, negative reactions—
130 days, 2 head 15.38%
160 days, 1 head 7.69%
190 days, 0 head ..... 00.0 %
11 bred cows, negative reactions—
40 days, 1 head ..... 9.9 %
190 days, 1 head ..... 9.9 %

Analysis—

Treated open heifers.....100%
Negative 130 days after treatment.
Treated open cows.....100%
Positive 190 days after treatment.
Treated bred heifers.....60%
Positive 190 days after treatment.
Treated bred cows.....90.1%
Positive 190 days after treatment.

Abortion rate previous to treatment, June to December 6th.....67%
Abortion rate for first twelve days after treatment 17%
Abortion rate, date of treatment to end of 190 day period.....27%

Abortions following first twelve days after treatment, excepting two mature cows, occurred in heifers not bred until after their agglutination reactions had become negative.

Herd No. 3

This record covers a period of about three years in-so-far as abortion data is concerned. Abortion did not exist in herd until sometime in 1927, origin unknown as herd record shows no additions for about ten years except as calves raised on the premises. Cows Nos. 3 and 6 were of original purchase and have never been off premise. Nos. 1-6-7-8-13-17 and 18 treated with abortion vaccine from one to three years previous to test, actual dates not obtainable.

Herd No. 4

This herd, pure bred holstein, in which but five calves had been lost from all causes over a period of the seven years during which the present herdsman had been employed, is given to show that extremes in agglutination titre, percentage of reactors, mingling of negative and positive individuals in a herd without spread of the disease, no animal having lost a second calf, goes to show that condemning a herd on agglutination test, etc., is a fallacy and usually a crime against the well being of the owner of such a herd. Had this owner had this herd tested by some institutions who are radical on the subject and he had abided by their usual instructions, he would not have had any herd left. His loss did not exceed normal, his animals were producers with no need to get excited over agglutination findings.

Key to following chart—H, heifer; C, cow; A, aborted; P, pregnant; O, open; N, normal calf.

No. 1—H., P., 4 months, agglutination titre, negative.
No. 2—H., P., 4 months, agglutination titre, negative.
No. 3—H., O., agglutination titre, negative.
No. 4—C., P., 2 months, agglutination titre, 1-200.
No. 5—C., P., 2 months, agglutination titre, 1-3500.
No. 6—C., O., N., agglutination titre, 1-25.
No. 7—C., A., 8th month, agglutination titre, 1-4000.
No. 8—C., A., 8th month, agglutination titre, 1-500.
No. 9—C., P., 7 months, A., 8th month, agglutination titre, 1-1000.
No. 10—C., O., N., agglutination titre, negative.
No. 11—C., P., 5 months, N., agglutination titre, negative.
No. 12—C., P., 5 months, N., agglutination titre, negative.
No. 13—C., P., 6 months, N., agglutination titre, 1-100.
No. 14—C., P., 5 months, N., agglutination titre, 1-50.
No. 15—C., P., 2 months, N., agglutination titre, 1-25.
No. 16—C., P., 1 month, N., agglutination titre, 1-25.
No. 17—C., P., 5 months, N., agglutination titre, 1-50.
No. 18—C., O., N., agglutination titre, negative.
No. 19—C., O., N., agglutination titre, 1-50.
No. 20—C., P., 6 months, N., agglutination titre, 1-6000.
No. 21—C., O., N., 3 days old, agglutination titre, negative.
No. 22—C., P., 8 months, N., agglutination titre, negative.

No. 23—C., O., N., agglutination titre, 1-500.
No. 24—C., O., N., 4 days old, agglutination titre, negative.
No. 25—C., O., N., agglutination titre, 1-25.
No. 26—C., O., N., agglutination titre, 1-50.
No. 27—C., P., 1 month, N., agglutination titre, negative.
No. 28—C., O., A., 8th month, agglutination titre, 1-2500.
No. 29—C., P., 5 months, N., agglutination titre, 1-100.
No. 30—C., O., A., 8th month, agglutination titre, 1-16000.

Average titre of herd.....1-1156.6
Average titre of reactors.....1-1826.3

Number of animals that have lost calves, 5 .....16.6%
Number of animals no calf loss, 25.83.4%

Average titre of aborters.....1-4800
Average titre of non-aborters.....1-428

Herd No. 5

Number of animals in herd of breeding age, 67.
Blood samples taken for herd identification, 12.

No.	Age years	Calves aborted no's	Calves normal no's	Retained placenta no's	Condition date of test	Previous treatment	Agglutination titre
1	4†	1 & 2	3	1 & 2	pregnant	vaccine	1-3000
2	9	7th	1 to 6	none	open	none	1-100
3	14	none	1 to 7	pregnant	none	none	1-25
4	5	none	1 to 4	none	pregnant	none	1-25
5	2	none	none	none	preg. 5 mo.	none	negative
6	13††	1 & 3	2-4 to 6	1 & 3	open	vaccine	1-100
7	7	1st.	2 & 3	1 & 2	pregnant	vaccine	1-400
8	6	1-2 & 3	4th	1 & 2	pregnant	vaccine 2	negative
9	7	none	1 to 5	none	pregnant	none	1-50
10	7	none	1 to 5	none*	pregnant	none	1-3200
11	3†	1st	2d	2d	open	none	1-800
12	4†	1 & 3	2d	1 & 3	open	none	vial broken
13	4†	3d	1-2 & 4	4th	open	vaccine	1-3000
14	4	none	1 & 2	none	pregnant	none	1-25
15	3	none	1	none	pregnant	none	1-50
16	2	none	none	none*	pregnant	none	1-4500
17	4†	2 & 3	1	2 & 3	pregnant	vaccine	1-200
18	6†	1 & 2	3-4 & 5	none	pregnant	vaccine	1-100
19	3	none	1st	none	pregnant	none	1-800
20	2	none	none	none*	pregnant	none	1-25
21	4†	1 & 3	2d	1 & 3	open	none	1-1600

*No's 10-16 and 20 have calved normally since the test.
†Age doubtful.
††Record doubtful; age and abortions not in accord with the herd history.

No. animals that have aborted 11.....52.2%
No. animals retained placenta 9.....42.8%
No. animals aborting one time 4.....36.3%
No. animals aborting two times 6.....54.2%
No. animals aborting three times 1.....27.2%
Calves lost by abortions—17. Total possible calves—64. Abortions.....26.5%
Average agglutination titre herd.....1-910
Average agglutination titre of aborters.....1-930
Average agglutination titre of cows calving normally.....1-966
Highest titre of aborters.....1-3000
Highest titre of cows calving normally.....1-3200
Highest titre in herd, bred heifer No. 16*.....1-4500
Average titre treated animals.....1-850
Average titre untreated animals.....1-800
Highest titre treated animals.....1-3000
Highest titre untreated animals (16*).....1-4500

Agglutination test showed of this number, 8 positive, 4 negative.

Per cent positive, 66.6; per cent negative, 33.3.

Over period of about two years 67% of possible calves lost.

Animals termed "bullers" by herdsman, 17 head.

Agglutination test made October 21, 1929.

Treatment October 29, 1929. Pregnant animals, serum and vaccine; open animals, vaccine only.

Last report to writer, September, 1930, one calf lost during period from date of treatment to above date, sixteen of the former "bullers" were pregnant at this time.

The above brief records represent a fair average of the findings over a long period of endeavor during which herds of all descriptions and existing in varied environments were encountered.

At the outset an attempt was made to gain some information as to whether titre of reacting animals might indicate that at some point real immunity existed. It was not long until it seemed evident that titre could not be depended on for any definite deductions.

In certain herds regardless of the fact that *B. abortus* was a premise invader, other pathology, other infections, dietetic and breeding abuses, etc. were incriminated. It is firmly believed by the writer that Dr. W. L. Williams is correct, if I am correct in my interpretation of his logic, that *B. abortus* is a facultative pathogen, that some influence is essential as a forerunner of its pathogenic role.

Artificially induced high titre indicates protection but natural high titre does not seem to mean a thing unless it be evidence of varying susceptibility to the invading organism.

Commercial abortion vaccines vary greatly in antigenic value. It is understood that a positively accurate determination of the antigenic value of a given product cannot be accomplished in field cases because of variance in individual susceptibility, however by selecting a given number of animals in a herd and treating a certain number with one product, a like number with another, etc., and subsequently testing over a given period there appears evidence that is practical if not hyper-technical.

In the beginning of the field experimenting, abortion anti-serum was administered simultaneously with abortion vaccine to pregnant animals. It was later concluded that this product was superfluous, that its passive protective virtues were not sufficient to warrant its use and that the possible antigen value of abortion vaccine was inhibited to a greater or less degree. It was shown that in some individuals the administration of abortion vaccine in regular dosage amounts induced reaction titres much higher than that of the tested anti-abortion serum.

As a safe, sane and practical method of abortion control, it was finally concluded that the administration of abortion vaccine of known avirulent viability to known pregnant animals was the proper method to follow. The scheme was to allow an animal to pass one or two normal heat periods after breeding and then administer abortion vaccine. If after treatment estrum occurred, the treatment should be repeated after breeding as before. As shown in one of the case reports, heifers will lose their immunity rapidly if remaining open and are again susceptible when negative reactors. It is very evident to me that some phenomena of pregnancy and maturity, either or both, accords a pathogenic role to *B. abortus* and likewise makes possible a longer period of higher resistance when abortion vaccine is used.

Many veterinarians who have adopted the method of administering abortion vaccine only after pregnancy is known to exist, have established an abortion control in herds wherein every other method ever suggested had failed completely.

It is true that as long as states enforce regulations prohibiting positive reacting animals to cross their borders, it will be unwise to use living cultures in animals

intended for interstate shipment at any near date, however such animals are the safest animals that may cross their borders.

The agglutination test is a reliable and practical means for the determination that *B. abortus* does or has existed on a given herd and is an aid in determining as to whether or not some other factor is causing calf losses; but as to any reading of reactions, high or low titres, in an endeavor to determine accurately the animals that are aborters, dangerous spreaders, etc., it has no value from any abortion control standpoint.

From an economical, calf-saving, client-satisfying standpoint that is practical for the animal owner who is beset by no restrictions of state or other regulations, abortion vaccine administered to pregnant animals will establish a protection in his herd that will insure a normal calf crop without any danger of spread of the disease in-so-far as treatment is concerned.

As I conclude these lines, the sun is shining brightly; summer is here; a south wind is muttering as do the tongues of men, a storm is in the offing, and softly muttering that all is well and if these lines ever go to print, there will be a whirlwind or a bunch of them come booming out of the four points of the compass to proclaim that an up-start has made statements that if taken seriously by veterinary practitioners will scatter abortion disease over another 100% of the cattle raising country. I hope such a thing happens and that the same fellows that doubt this logic will turn some of the herds that they have endeavored to clean up by *orthodox* methods, to any number of veterinarians whom I can mention, then go away back and sit down where the cows will not have to look at them and watch the baby bovines come bursting into the light of day while the owner smiles with satisfaction and forgives them for the wrongs they have wished on him for years.

Sherman and Stiebeling of Columbia University have announced the discovery that vitamin G, the anti-pellagra vitamin, is not a single substance but in reality two vitamins for which they suggest tentatively the names vitamin Gx and vitamin Gy. It will be recalled that only recently has vitamin G been separated from vitamin B. In England it is still called Vitamin B_2. Goldberger showed that the absence of this vitamin or of these vitamin from the diet of dogs results in blacktongue.

According to Schmidt, tuberculosis of the horse is not extremely rare. Horses are susceptible to the human, bovine and avian types of tubercle bacilli. The digestive tract is probably the usual portal of entrance for the infection. The lung is affected most frequently. Lesions may be found also in the spleen, mesenteric, lymph glands and liver. Horses respond to the tuberculin test (subcutaneous) and this is the recommended diagnostic procedure.—Bio. Abs. 28237.

Sore mouth in lambs has been more or less prevalent in some sections of southwest Texas for the last few years. The cause of the malady has not been positively identified. According to reports, the condition spreads rapidly in a band of sheep and the losses may be relatively large in range bands because of inability to eat. This malady apparently is not due to *B. necrophorous* infection. It may be sheep-pox, although at this time no causal relation of a filterable virus has been demonstrated.

A venereal disease survey of New Orleans, made February 2, 1931, revealed 2,144 cases of gonorrhea and 2,676 cases of syphilis under treatment on that day by licensed physicians and public institutions. This gives a prevalence rate for the two diseases of 6.8 per 1,000 population; the lowest in any of the eleven cities so far surveyed by the U. S. Public Health Service. Memphis, Tenn., with venereal disease prevalence of 19.9 per 1,000 stood highest of the eleven cities surveyed.

INSTRUCTIONS FOR VACCINATION OF FOWLS WITH FOWL POX VIRUS

Vaccination with living fowl pox virus is to be recommended only in flocks on premises where the disease has appeared previously. The use of the virus requires that vaccination of all young stock on the place be carried out the following season. Great care must be exercised to prevent dissemination of the infection to other premises by individuals who have handled the virus or diseased birds.

Good results must not be expected if flocks are heavily infested with worms or other parasites, or if they are low in vitality due to other causes. Best results are obtained by vaccinating healthy, immature birds, preferably those 30 to 90 days of age.

In vaccinating, the following steps should be carefully carried out:

1. The blade of a small sharp-pointed knife is wrapped with adhesive tape, leaving only the tip exposd. (3/16 inch.)

2. The powdered virus is suspended by adding salt solution, and shaking vigorously for several minutes. Occasional shaking during its use is necessary to prevent its settling out. The material should not be used later than 2 hours after it has been mixed, and under no conditions should it be exposed to *direct sunlight* or extreme warmth. No more than 200 doses should be mixed at one time, and the material should be used within the *2 hour time limit.*

3. A small amount of the material is then poured into the glass vial, or other container, and a small piece of cotton is placed in the bottom to protect the knife point when it is dipped into the virus before each inoculation.

4. The birds are placed on their sides on a table or box. A bare area of skin is located by brushing up the feathers outside and below the thigh joint of the leg; or the bare area on the breast below the wing may be employed.

5. The knife point, which has been dipped into the pox virus suspension, is then thrust *through* the skin of this area. For birds 30 to 90 days of age, 4 "sticks" are made, while older birds should receive only 2. The knife point should be dipped before each "stick."

No general change in management or care of the flock is necessary, but it is essential that the flock be carefully protected against any unfavorable conditions for three weeks after vaccination.

Six to seven days after vaccination, 10 to 15 per cent of the birds in the flock should be caught and examined to determine if swellings and scabs have formed at the point of vaccination. If 80 per cent of these birds do not show swellings and scab formation, it indicates that the vaccination was improperly done or that the virus used had lost its strength through improper handling. Under ordinary conditions where the percentage of "takes" is low, it is advisable to revaccinate. A general reaction following vaccination usually occurs during the third week and after the scabs have formed and disappeared. The older the bird the more severe the reaction, and consequently fewer "sticks" are desired or required as the birds become older. Laying flocks usually show a marked continued drop in production, while worm-infested and weak birds may die following vaccination. In vigorous young birds kept under favorable conditions, little difficulty and few losses are usually experienced.

The vaccine should be used within four days after it is received; and when it is not in use, it should be stored in a cool place.

Pigeon pox virus, because of the much less severe reaction on egg production and health, is frequently used in laying flocks in which an outbreak of fowl pox has occurred, or in flocks having been exposed to infection. However, the degree of protection is lower and of shorter duration than that resulting from the use of fowl pox vaccine.

Satisfactory results should not be expected unless directions are followed carefully.

C. A. Brandly.

Manhattan, Kan.

Anti-sterility Treatment of Cows and Sows With Vitamin E*

It has long been known that nutrition plays a rôle in fertility in man and animals (1). The investigations of recent years have thrown light on the factors which are responsible for fertility. The existence of a fat-soluble anti-sterility vitamin—vitamin E—has been proved beyond doubt. Many research workers have investigated the relationship of fertility to certain factors during the past decennium. It has been conclusively proved (2, 3, 4, 5) that rats, fed over a certain period of time on an artificial ration to which all the known vitamins were added, did not reproduce. In order to cause rats to reproduce, it was necessary to add to their ration a fat-soluble substance which was named "X-substance" originally, but later it was renamed vitamin E (6). Many monographs, dealing with vitamin E, have appeared in recent years (7, 8, 9, 10, 11).

Vitamin E is found in certain plant oils, but most abundantly in wheat-germ oil, also in many other oils of plant origin. Thus it was found in raw maize oil (12), but not in the commercial maize oil; neither was it found in coco- nor in rape-oil. Investigations of the writers seem to indicate that most oil-cakes contain just traces of vitamin E or none at all. Large amounts of vitamin E are found in vegetable leaves, for instance in lettuce; on the other hand, little or no vitamin E occurs in foods of animal origin. Thus cod liver oil contains merely traces of vitamin E or none at all. Certain varieties may possibly possess larger amounts (13). The Norwegian and American cod liver oils, examined by the writers, did not contain vitamin E, but they found, in agreement with others (14, 15), that overdosage of cod liver oil causes abortion in laboratory animals (mice and rats).

The significance of vitamin E for the organism has for the present, to a certain extent, been interpreted for rats only. It was found that mice need this vitamin also (16). The writers too have experimented with rats as well as with mice and seem to think that mice are more suitable to this study than rats. As far as the writers are aware, the literature does not contain any records as to the vitamin E requirements of animals other than the ones mentioned, nor as to favorable therapeutic results with vitamin E preparations previous to the preliminary note of Vogt-Möller and Bay (17, 18).

The sterility resulting from the lack of this vitamin in the diet is of different pathogenesis in the two sexes. In the male animal the vitamin seems to play a rôle in the spermatogenesis. In cases of E-avitaminosis, histological lesions are found in the testes, usually a more or less pronounced degeneration of the spermatogones, even their complete disappearance. In typical cases the testes are atrophied and below normal weight. In the female animal, fed on a vitamin E deficient ration, ovulation and implantation occurs normally because the reproductive system is not damaged and the sterility is caused by the resorption of the implanted eggs early in the beginning stage of gravidity. Vitamin E may be stored, to a certain extent, in the male and female animal (19). The significance of vitamin E for lactation has also been discussed. It was first assumed (20) that vitamin E (in wheat-germ oil) consists of two factors: one of them to be of importance for reproduction and one to be related to lactation. This assumption could not wholly be maintained when it was proved (21, 22) that this vitamin is not absolutely related to lactation. However it was found that vitamin E is necessray for nursing baby-rats; for, deprivation of vitamin E caused a persistent paralysis of the posterior legs, though

*Vogt-Möller, P., and Bay, F., 1931. Sterilitätsbehandlung bei Kühen (und Säuen) mit Weizenkeimöl (Vitamin E). (Anti-sterility treatment of cows and sows with wheat-germ oil,—Vitamin E.) *Münchener Tierärztliche Wochenschrift* 82 (53): 637-640. Translated by F. Volkmar.

the nurselings were in perfect health. As to lactation, it may be mentioned here that during this period an increase of protein and of vitamin B-complex is necessary to insure normal growth of the nurselings (23).

Vitamin E addition was shown to cause increase in body-weight in the animals (24). This, however, did not take full effect until the rats has grown up, as the addition did not improve the weight during the period of growth. It was also shown (25, 26) that various fats, for instance pig-lard, when mixed with vitamin E (wheat germs or wheat-germ oil), will deprive the latter of its vitamin value. The vitamin destroying property of the fat increased proportionally with its rancidity and attention was called (22) to the possibility of destroying vitamin E by the development of rancid substances in wheat-germ oil itself, and the importance of the use of fresh products.

The preparation used in the experiments reported below, was wheat-germ oil which was obtained in the manner described by Vogt-Möller and Bay (17, 18) and Vogt-Möller (27) and it was the same product which Vogt-Möller (28) used successfully in the treatment of habitual abortion of women. The preparation used in the treatment for cows was tested every time on mice as to biological efficiency. Wheat-germ oil contains traces only of vitamin A (24). Merely a few drops of wheat-germ oil are required daily. Vitamin E (wheat-germ oil) is said (7) to be efficient with enteral application as well as with parenteral application. The assertion (29, 30) that wheat-germ oil contains toxic principles, extractive with ether, has been disproved thoroughly (31). Vogt-Möller (27) gave daily 10 drops of wheat-germ oil to mice without toxic effect.

Since the writers had experimented for several years with vitamin E and its reproduction in laboratory animals (mice, rats), without encountering essentially new experiences aside from confirming the results of Evans and Burr, it occurred to them to test the practicability of applying the teachings of the accumulated experience, the more so, as long ago they had come to the conclusion that the cause of infertility in cows is not so much due to pathological conditions in the ovaries and in the uterus but due to an existing complicating casual relationship which possibly depended upon the manner of keeping and feeding these cows.

It is well known that for generations the trend has been: more milk and more butter-fat, and in addition the cows are expected to utilize in ever increasing amounts divers by-products from other industries. These by-products (coco-nut, cotton, rape, sugar, etc.) would have no value otherwise. To make this bovine performance of converting the above by-products into rich milk more difficult yet, the cows are chained to one and the same spot for three-quarters of the year and thus cheated out of sunlight and fresh air. Therefore, it should not be wondered at, that under such circumstances, contrary to the natural laws for cows, a disproportionality or even complete deficiency of certain substances, absolutely essential for conception and reproduction, should occur. It is difficult to place the finger on the deficiency involved, but from practical observation it seems that the lack of three things especially deserves attention: protein, minerals and vitamin; of the latter, the vitamin E should be kept in mind. At any rate there is sufficient reason to consider the question of a revision of the feeding of milk-cows.

In the experiments reported below, the wheat-germ oil was injected intramuscularly into cows. The dosage was arrived at by guesswork. Only cows which appeared to be in estrus but which did not conceive in spite of repeated service, were used. Rectal examinations were made previous to each treatment and the preparation was injected only in those cases in which everything seemed normal anatomically, that is, in which no lesions on uterus, ovaries and oviduct, and of course no other pathological lesions anywhere on the animal were demonstrable. The experimental animals—all of them Red Danish milk-cows—were selected whenever suitable animals were met in the practice, and when their owners gave consent

to the experimentation and the promise not to dispose of the animals until the writers had an occasion to ascertain the result of the treatment.

The cows were selected without consideration as to their age. Some were treated during their estrus period, others between estrus periods. The former were bred whenever possible on the same day; the latter on the first day of estrus following treatment. The animals are enumerated below in chronological order with notes as to the dates of breeding and calving, of the dosage of wheat-germ oil and other data. It should be noted that where no mention to the contrary is made, parturition was normal and the cow in good condition. The injection of wheat-germ oil never caused local or general pains.

Experiment 1.—Cow 5 years old; previous calving 4/1/'30; in estrus and bred 5/10; quiet for two months; then in estrus again and following this regularly bred every 3 weeks. During estrus on 11/6 intramuscular injection of 10cc wheat-germ oil and bred on the same day; quiet down. Examination on 2/7/'31 demonstrated pregnancy (ca 3 months). Parturition normal.

Experiment 2.—Cow 10 years old; previous calving 1/20/'30; bred 2/27; 3/20; 4/10; 5/1; 5/23; 6/14; 7/22 (ovarian treatment on this day); 8/12 (ovarian treatment repeated); consecutively bred every 3 weeks, except a few times during autumn when she was not led to the bull, although being in heat. On 11/8 treated intramuscularly with 10cc wheat-germ oil; bred 11/21 and became quiet. Examination on 2/11 revealed pregnancy (ca 2½ months.) Calved normally.

Experiment 3.—Cow 5 years old; previous calving 5/4/'30; bred 6/5, 7/27, 8/16, etc. until 11/8 on which day she was treated with 10cc wheat-germ oil. On 11/8 she was bred. When examined 2/11/'31 she was found gravid (ca 2½ months.) Calved normally.

Experiment 4.—Cow 3 years old; previously calved 1/5/'30; bred 2/20, 4/3, 5/22, 6/23. Ovarian treatment 7/22; bred 8/17 etc. 11/8, while in estrus, she was treated intramuscularly with 10cc wheat-germ oil. 12/1, on her following estrus she was not led to the bull. Examining her 2/11/'31, she was found pregnant (2½ months). Calved normally.

Grade Hereford and her quadruplet calves

Experiment 5.—Cow 3 years old; previously calved 6/13/'30; bred 7/13, 8/5, 9/9, 10/10, 11/1. On 11/11 treatment with 10cc wheat-germ oil; bred 11/18 and became then quiet. When examined 2/6/'31 she was found pregnant (ca 2½ months). Calved normally.

Experiment 6.—Cow 5 years old; previously calved 6/17/'30; bred 8/7, 9/19, 10/20, 11/11; on the latter day, while in estrus, treated with 10cc wheat-germ oil intramuscularly. Examination 2/6 proved the cow to be pregnant (ca 3 months). Calved normally.

Experiment 7.—Cow 11 years old; previously calved 10/14/'29; bred 12/28/'29, 1/27/'30, 2/16, 3/28, 4/17, 5/14, 6/27, 7/25, 8/15, 9/4, 9/26, 10/4, 11/11. Two or 3 times ovarian treatment. On 11/11, while in estrus, treated intramuscularly with 10cc wheat-germ oil and bred the same day; she became quiet but when examined 2/6, was found to be non-pregnant.

Experiment 8.—Cow 5 years old; previously calved 4/29/'30; bred 6/17, 7/6, 9/31, 10/2. On 11/12 treated intramuscularly with 20cc wheat-germ oil; bred 11/4 and 11/26. She was very restless and had to be restrained; then she became quiet. On examining her 2/24 she was found pregnant (2½ months). Calved normally.

Experiment 9.—Cow 7 years old; previously calved 7/24/'30; bred 9/7, 10/2, 11/8. On 11/20 treated intramuscularly with 20cc wheat-germ oil; bred twice, the last time on 12/25. When examined 2/24, she was found non-pregnant.

Experiment 10.—Cow 6 years old; previously calved 10/28/'29; bred 5/10/'30, 7/25, 8/24, 10/30, 11/19; on this latter day she was in estrus and was injected intramuscularly with 20cc wheat-germ oil. She was bred the same day and became quiet. When examined 2/10/'31 she was found pregnant (ca 2½ months). Calved normally.

Experiment 11.—Cow 6 years old; previously calved July 1929; gives milk abundantly. First time rebred after 2½ to 3 months and thereafter every 3 weeks; co-habitation with two different bulls. Owner abandoned further breeding attempts for several months. On 11/22/'30 she was given 12cc wheat-germ oil, having exhibited estrus a few days earlier. On 12/14 the cow was bred and when examined 2/24/'31 she was found pregnant (ca 2½ months). Calved normally.

Experiment 12.—Cow 7 years old; bred 7 to 8 times; on 3/21 treated intramuscularly with 20cc wheat-germ oil; bred every 3 weeks. When examined early in August, the cow was found to be non-pregnant.

Experiment 13.—Cow 5 years old; previous calving August 1930; bred 10/8, 10/25, 11/17, 12/16/'30, 1/30/'31, 2/17, 3/23 and 4/2; on the latter day treated intramuscularly with 30cc wheat-germ oil; subsequently bred several times. When examined early in August, she was found non-pregnant.

Experiment 14.—Cow 6 years old; previous calving 12/5/'30; bred 2/5, 2/15, 2/25, 3/10 and 3/27.

On the latter day she was treated intramuscularly with 20cc wheat-germ oil. When examined the middle of August she was found pregnant.

Experiment 15.—Cow 4 years old; previously calved 12/6/'30; bred 1/25, 2/16, 3/14 and 4/4; on the latter day treatment intramuscularly with 30cc wheat-germ oil. When examined on 7/13 she was found to be pregnant.

Experiment 16.—Cow 8 years old; previously calved 5/3/'30; bred September, 11/8 and 12/27 and also in January and March. On 4/4 treated intramuscularly with 20cc wheat-germ oil and bred 4/9. When examined 8/15 she was found pregnant.

Experiment 17.—Cow 4 years old; previously 2 normal calvings; bred 6 to 7 times at regular 3 weeks interval; on 4/19 the last breeding; on this day 20cc wheat-germ oil injected intramuscularly. When examined 8/22/'31 she was found pregnant.

Experiment 18.—Cow 6 to 7 years old; previous calving and breeding at about the same seasons as cow No. 17. On 4/19 treated intramuscularly with 20cc wheat-germ oil. When examined 8/22 she was found pregnant.

Experiment 19.—Cow 7 to 8 years old; previously bred 9 times. On 4/18 treated intramuscularly with 20cc wheat-germ oil; breeding repeated until the middle of August. When examined 8/30 she was found pregnant.

Experiment 20.—Cow 7 years old. After being bred five to six times she was treated intramuscularly with 10cc wheat-germ oil on 6/2 and then bred once. When examined 8/31 she was found pregnant.

The material presented here is not sufficient upon which to draw definite conclusions. At any rate it illustrates that vitamin E preparations may possess therapeutical value in the anti-sterility treatment of cows. Considering all the circumstances and the fact that the dosage was rather arbitrary and that three cows did not respond to repeated uterus and ovary treatments, while others merely failed to respond to repeated ovarian treatment, it must be confessed that none of the hitherto known methods would have given better results with a single treatment in a collection of chronic non-breeders like the present one. The writers express the opinion that their results justify the continuation of the experiments on a larger scale. This treatment seems to be of therapeutical value in the treatment of sterility of sows too. A contribution to this phase is in preparation.

Conclusions

Vitamin E and its significance for the organism and the pathological lesions produced by lack of vitamin E in the diet are discussed.

The results of anti-sterility treatment of cows with wheat-germ oil (vitamin E) are reported.

The results obtained with a single intramuscular dosage of wheat-germ oil are so encouraging that further experiments with this therapy seem to be indicated. It also seems to be of value in the treatment of sterility of sows.

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Live Stock Remedies*

By A. E. LANGWORTHY, Topeka, Kansas
Control Division, Kansas State Board of Agriculture

ACCORDING to the records in our office we have sold tax tags or stamps for live stock remedies in such amounts as to indicate that the average sale per year of these remedies in Kansas for the last five years has been:

19,793	tax tags for	100-lb. packages.
6,896	tax tags for	50-lb. packages.
756	tax tags for	30-lb. packages.
36,180	tax tags for	25-lb. packages.
2,730	tax tags for	20-lb. packages.
21,045	tax tags for	15-lb. packages.
31,440	tax tags for	10-lb. packages.
329,825	tax tags for	5-lb. packages.

A total of 448,665 packages of all sizes per year—more than five and one-half million pounds. If we allow a price of $1.00 per package, which is, I think fairly conservative (particularly when some of these remedies sell for as high as $17.00 per gallon, with, oftentimes, one to five gallons to a single package covered by a single tax tag or stamp), it means that there may have been sold in Kansas an average of about $448,665 worth of live stock remedies in a year's time, and that too, in spite of the fact that in Kansas the sale of these remedies is subject to pretty strict supervision and control. It is fair, I think, to assume that the volume of live stock remedy sales in other states is at least as large.

Now let us examine a little into the character of the material which costs this amount of money.

A study of our old live stock remedy registrations which were accepted under the provisions of our old law, shows that very many were compounded apparently along the line of the old-fashioned "shotgun" prescription, with the idea that if enough different ingredients were used in a remedy maybe one of them would hit the spot and do some good. Others were composed of ingredients of recognized merit for the specific purpose for which they were intended.

Live stock remedies may be divided into several classes according to the purpose for which they are intended to be used; such as stock tonics, conditioners, powders and regulators, vermifuges, colic remedies, poultry tonics, and roup remedies. A study of the registrations of live stock remedies on file with the Control Division under the old law, shows the quite natural circumstance, that a very large number of different ingredients were used in their manufacture.

In fifty-six remedies for the use of live stock, the brand names of which indicate that they were intended as tonics—that is, as remedies which increase the tone and vigor of the system—ninety-six ingredients were used. Of the ninety-six ingredients, the following were used in only one remedy each:

Acacia (gum arabic).	Mustard bran.
Aloin.	Oil of caraway.
Animal charcoal.	Oil of fennel.
Black-haw bark.	Oil of sassafras.
Buchu leaves.	Paraffin oil.
Buckwheat hulls.	Phenol.
Calcined magnesia.	Pipsissewa.
Calcium oxide (lime).	Potassium bichromate.
Caraway seed.	Potassium permanganate.
Cinchona bark.	Potassium tartrate.
Cloves.	Rhubarb.
Copper sulphate.	Rosin weed.
Cottonseed feed.	Rye shorts.
Cottonseed hulls.	St. John's bread.
Fennel seed.	Sodium arsenate.
Germ meal.	Sodium arsenite.
Hydrochloric acid.	Sodium carbonate.
Linseed oil.	Sulphuric acid.
Lobelia seed.	Syrup, and
Molasses.	Talcum.

Each of the following were used in two remedies:

Alcohol.	Mustard seed.
Alfalfa meal.	Oil cake.
Calcium phosphate.	Oil of anise.
Cocoa shells.	Peanut hulls.
Columbo.	Podophylum.
Fluid extract of gentian.	Potassium carbonate.
Horse medley.	Pumpkin seed.
Magnesium chloride.	Sodium phosphate.
Magnesium sulphate.	Turpentine, and
	Water.

Each of the following were used in three remedies:

Cascara sagrada bark.	Peat.
Cereals (ground).	Rosin.
Corn meal.	Sanguinaria and
Elm bark.	Santonica.

*Presented at the meeting of the North Central States Assn. of Dairy, Food, Drug and Food Officials, Omaha, Neb., June 7-8, 1932.

Each of the following were used in four remedies:

Areca nut.	Curcuma (tumeric).
Asafetida.	Coriander seed, and
	Sodium thiosulphate.

Each of the following were used in six remedies:

Tobacco.	Chenopodium.
Starch.	Juniper berries, and
	Screenings.

Iron oxide and sassafras bark were each used in seven remedies.

Elecampane was used in eight remedies.

Glycyrrhiza (licorice root) was used in eleven remedies.

Middlings (shorts) was used in thirteen remedies.

Potassium nitrate was used in fourteen remedies.

Nux vomica was used in fifteen remedies.

Quassia was used in seventeen remedies.

Capsicum (cayenne pepper) was used in nineteen remedies.

Anise seed was used in twenty-two remedies.

Sodium sulphate (Glauber's salt) was used in twenty-three.

Sodium bicarbonate (baking soda) was used in twenty-four remedies.

Ginger was used in twenty-seven remedies.

Sulphur was used in thirty-two remedies.

Fenugreek and gentian were used in thirty-four remedies.

Charcoal was used in thirty-seven remedies.

Iron sulphate (copperas) was used in thirty-nine.

Sodium chloride (common salt) was used in forty-three remedies.

Of the ninety-six ingredients used, 11 (11.5%) have a recognized reputation as tonics; they are:

Cinchona bark.	Iron oxide.
Columbo.	Iron sulphate.
Elecampane.	Nux vomica.
Gentian.	Quassia.
Fluidextract of gentian.	Sodium arsenate.
	Sodium arsenite.

The following 15 ingredients each were used frequently:

Anise.	Middlings.
Capsicum.	Nux vomica.
Charcoal.	Potassium nitrate.
Fenugreek.	Quassia.
Gentian.	Sodium bicarbonate.
Ginger.	Sodium chloride.
Iron sulphate.	Sodium sulphate and
	Sulphur.

This might lead to the supposition that these fifteen ingredients are all of considerable value as tonics, but as shown above, only four of the 15—gentian, iron sulphate, nux vomica and quassia have a recognized reputation as such.

Anise, capsicum, fenugreek and ginger are of use in cases of intestinal gas or colic and in disguising other ingredients by their taste and odor. The use of fenugreek in particular is very prevalent. Just why it is so universally used in stock remedies is hard to explain, as it does not appear to have any remedial value worth mention. The apparent reason for its use is to make a remedy "smell like a stock remedy." One authority, however, reports a case where it was used as an appetizer and was apparently relished by a group of colts.

Charcoal is of value in indigestion, intestinal gas, and as an absorbent.

Middlings, or shorts, in a remedy must be regarded only as a filler, although it has nutritive value.

Potassium nitrate is a decided diuretic.

Sodium bicarbonate (common baking soda) is of possible value in acidity of the stomach, intestinal gas, etc.

Sodium chloride (common salt) not only has some remedial value, but is a necessity to stock, as it is an important constituent of the blood. It is partially decomposed in the stomach, forming the hydrochloric acid so necessary to digestion. Salt is also greatly relished by stock, therefore its use in so many remedies is easily understood. But when an excessive amount of salt is used in a remedy and its presence disguised by such drugs as charcoal, fenugreek, gentian, etc., it must be regarded as a filler.

Sodium sulphate or Glauber's salt is a valuable purgative in sufficient dosage. In small doses it is a laxative.

Sulphur as a remedy is probably much overrated, as it is not a very active remedial agent, and what action it does have is somewhat obscure. If given in large doses it passes through the system unchanged; therefore when it is present in a remedy in an excessive amount it can be regarded only as a filler.

Of the eighty-six ingredients used in sixty-two condition powders and similar remedies, each of the following were used in only one remedy:

Ammonium chloride.	Hyoscyamus.
Asafetida.	Jalap.
Belladonna.	Leptandra.
Buckwheat hulls.	Lobelia.
Calomel.	Mander.
Cereals (ground).	Mustard bran.
Cinchona bark.	Myrrh.
Cocoa shells.	Pearl ash.
Columbo.	Reduced iron.
Corn meal.	Rumex (yellow dock).
Cottonseed meal.	Sassafras.
Dried blood.	Sodium carbolate.
Elm bark.	Spanish brown.
Eucalyptus.	Turpentine.
Flour.	Valerian and
	Vegetable hog ash.

Each of the following were used in two remedies:

Alum.	Juniper berries.
Arsenic.	Palmo meal.
Ashes.	Rhubarb.
Buchu leaves.	St. John's bread (locust
Calcium oxide (lime).	Santonica.
Caraway.	Senna.
Cascara sagrada.	Soda ash.
Echinacea.	Sugar and
Elecampane.	Tobacco.

Each of the following were used in three remedies:

Aloes.	Podophyllum.
Coriander.	Screenings (grain).
Fennel.	Sodium nitrate and
	Venetian red.

Poplar bark and potassium bitartrate (cream of tartar) were each used in four remedies.

Black antimony (pure) and sodium carbonate (Washing soda) were each used in five.

Horse medley (commercial black antimony) was used in six remedies.

Areca nut and phytolacca (pokeroot) were used in seven remedies.

Flaxseed and sodium thiosulphate (hyposulphite) were used in eight.

Magnesium sulphate was used in nine remedies.

Middlings (shorts) was used in 10 remedies.

Glycyrrhiza and rosin were used in 11.

Capsicum (red pepper) and chenopodium (American wormseed) were used in 12 remedies.

Quassia was used in 13 remedies.

Sanguinaria (blood root) was used in 14 remedies.

Nux vomica and oil meal were used in 16 remedies.

Anise was used in 20 remedies.

Potassium nitrate (saltpetre) was used in 23.

Sodium bicarbonate was used in 27.

Sodium sulphate (Glauber's salt) was used in 28.

Sodium chloride (salt) was used in 30.

Gentian was used in 35.

Fenugreek was used in 39.

Charcoal and iron sulphate (copperas) were used in 42 and Sulphur was used in 52 or in all but 10 of the remedies.

Of the eighty-six ingredients used in the sixty-two remedies, the following 21 were used most frequently:

Anise.	Middlings (shorts).
Capsicum.	Nux vomica.
Charcoal.	Potassium nitrate.
Chenopodium.	Quassia.
Fenugreek.	Rosin.
Gentian.	Sanguinaria.
Iron sulphate.	Sodium bicarbonate.
Glycyrrhiza.	Sodium chloride.
Horse medley.	Sodium sulphate, and
Magnesium sulphate.	Sulphur.

The properties of anise, capsicum, charcoal, fenugreek, gentian, iron sulphate, middlings or shorts, nux vomica, potassium nitrate, quassia, sodium bicarbonate, sodium chloride, sodium sulphate, and sulphur have already been explained.

Chenopodium is an anthelmintic. Glycyrrhiza or licorice root is popularly supposed to be of some use in bronchial and lung troubles and is also used a great deal to disguise the taste of other drugs.

Horse medley, often used as a substitute for black antimony in stock remedies has been found by analysis to consist in some cases of coal dust and in others of coal and marble dust mixed; not even a trace of antimony was found. Needless to say, it has no remedial value.

Magnesium sulphate or Epsom salt is a valuable cathartic. Oil meal is a filler. Rosin, when administered internally, has very little effect and its value is probably overestimated. Sanguinaria or bloodroot is an emetic in an ordinary dose, but is very seldom employed by veterinarians, its use being obsolete.

In thirty-seven remedies for horses, cattle and hogs, the names of which indicate that they were intended as vermifuges—sixty-one ingredients were used; the following twenty-two, in only one remedy each:

Antimony and potassium tartrate (tartar emetic).
Aspen bark (poplar bark).

Calcium oxide (lime).	Fluidextract of pinkroot.
Cascara sagrada.	Iron oxide.
Cinchona.	Kamala.
Copper sulphate.	Oleoresin of male fern.
Corn meal.	Palmo meal.
Corn starch.	Powdered extract of kan
Curcuma (tumeric).	Senna.
Elm bark.	Spigelia (pink root).
Flaxseed.	Tansy, and
Glycerine.	Wormwood.

The following were each used in two remedies:

Areca nut.	Neutral oil.
Asafetida.	Podophyllum.
Ashes.	Potassium nitrate.
Cottonseed oil.	Sassafras.
Elecampane.	Turpentine and
Fennel.	St. John's bread.

Aspidium (male fern), glycyrrhiza (licorice root), naphthalene, screenings, and santonica (Levant wormseed) each were used in three remedies and capsicum (red pepper), fenugreek, magnesium sulphate (Epsom salt), nux vomica and sodium thiosulphate were each used in four remedies.

Calomel and ginger were each used in five remdies.

Aloes and anise were each used in seven remedies.

Tobacco was used in six.

Gentian and quassia were each used in eight.

Antimony sulphide (black antimony), santonin and sulphur were each used in ten.

Chenopodium was used in 13.

Sodium sulphate was used in 15.

Sodium bicarbonate (baking soda) was used in 16.

Sodium chloride was used in 19.

Charcoal was used in 22 and

Iron sulphate was used in 25 remedies.

It is worthy of note that of the sixty-one ingredients used in the thirty-seven vermifuges, only the

following eighteen (30%) have a recognized reputation as anthelmintics; that is, as drugs which kill or expel worms.

Antimony and potassium tartrate.	Naphthalene.
Areca nut.	Oleoresin of male fern.
Aspidium (male fern).	Powdered extract of kamala.
Arsenic.	Quassia.
Chenopodium.	Spigelia.
Copper sulphate.	Tobacco.
Fluidextract of pink root	Turpentine.
Iron sulphate (copperas)	Santonica, and
Kamala.	Santonin.

The aloes, calomel, cascara sagrada, cottonseed oil, flaxseed (linseed), magnesium sulphate (Epsom salt) and podophyllum (mandrake or May Apple) are useful as cathartics in expelling the worms which the anthelmintics have killed.

In twenty-one remedies evidently intended for colic, the following twenty-seven ingredients were each used in only one remedy:

Ammonium carbonate.	Oil of nutmeg.
Compound spirit of Ether	Oil of rosemary.
Cresol.	Oil of spearmint.
Fluidextract of aconite.	Oil of tar.
Fluidextract of aloes.	Oleoresin of ginger.
Fl. Ext. of echinecea.	Phenol.
Fluidextract of rhubarb.	Red Saunders.
Fl. Ext. of strammonium.	Soap, castile.
Ginger.	Sodium sulphate.
Magnesium sulphate.	Compound Spirits of Eth
Oil of anise.	Tincture of hyoscyamus.
Oil of eucalyptus.	Tincture of lobelia and
Oil of lavender.	Tincture of nux vomica.
Oil of lemon.	

The following were used each in two remedies:

Chloral hydrate.	Spirit of ammonia arom.
Oil of peppermint.	Spirits of camphor.
Sodium thiosulphate.	Tincture of aconite and
	Tincture of asafetida.

The following in three remedies:

Ammonia water.	Spirit of nitrous ether.
Fl. Ext. of belladonna.	Tincture of ginger.
Fluidextract of ginger.	Turpentine and
Linseed oil.	Water.

Camphor, colocynth (bitter apple) and spirit of peppermint each were used in four remedies.

Chloroform, fluidextract of cannibis, fluidextract of capsicum, and tincture of opium in six remedies each.

Ether was used in 10 remedies, and alcohol was used in 13.

It may be observed that the following ingredients were frequently used in the twenty-one colic remedies:

Ammonia water.	Fl. Ext. of capsicum.
Camphor.	Fl. Ext. of ginger.
Chloroform.	Spirit of peppermint.
Ether.	Tincture of capsicum.
Fl. Ext. of belladonna.	Tincture of ginger.
Fl. Ext. of canabis.	Tincture of opium.
	Turpentine.

These are all valuable remedial agents and the use of one or more of them is indicated in some forms of colic. However, on account of the fact that there are various forms of colic, caused by a wide variety of conditions, it is a difficult matter to compound a single remedy that will relieve the trouble in all cases.

In forty-eight poultry tonics and remedies of like nature, the following thirty-nine ingredients each were used in only one remedy:

Aconite.	Juniper.
Aloes.	Magnesium oxide.
Ashes.	Oil of anise.
Bone ash.	Oyster shell.
Calcium oxide (lime).	Peanut hulls.
Capsicum tailings.	Pepper tailings.
Caraway.	Phenol.
Cascara sagrada.	Phytolacca (poke root).
Chalk.	Pimento (all spice).
Chenopodium.	Potassium bichromate.
Clover.	Powdered extract of nux vomica.
Cocoa shells.	
Corn starch.	Rhubarb.
Cottonseed hulls.	Rubus (blackberry).
Cottonseed meal.	Senna.
Crysco grit.	Soda ash.
Cubeb.	Sodium carbonate.
Elecampane.	Talcum.
Elm.	Tankage and
Flour.	Whiting.

The following were each used in two remedies:

Anise.	Iron subcarbonate.
Black antimony.	Palmo meal.
Calcium phosphate.	Potassium bitartrate.
Camphor.	Potassium permanganate.
Cereals.	Slaked lime, and
Curcuma (tumeric).	Water.

Each of the following was used in three remedies:

Cantharides.	Hydrastis.
Alum.	Mustard.
Cinchona.	Oil cake.
Columbo.	Podophyllum.
Glycyrrhiza.	Screenings (grain) and
	Sodium thiosulphate.

Alfalfa meal, asafetida, dried blood and Sanguinaria (blood root), were each used in four remedies.

Sassafras was used in five remedies.

Flaxseed was used in six.

Corn meal, iron oxide, and magnesium sulphate were each used in seven.

Calcium carbonate was used in eight.

Bone, potassium nitrate (saltpetre) and quassia were each used in nine.

Nux vomica was used in 10.

Fenugreek was used in 11.

Shell was used in 13.

Middlings (shorts) was used in 14.

Sodium carbonate (baking soda) was used in 16.

Sodium chloride (salt) was used in 18.

Gentian was used in 24.

Ginger and sodium sulphate (Glauber's salt) were each used in 31.

Charcoal was used in 33.

Iron sulphate (copperas) was used in 34.

And capsicum was used in 40, or in all but eight of them.

The following eighteen ingredients were each frequently used in the forty-eight poultry tonics:

Bonemeal.	Magnesium sulphate.
Calcium carbonate.	Middlings.
Capsicum.	Nux vomica.
Charcoal.	Quassia.
Corn meal.	Shell.
Gentian.	Sodium bicarbonate.

Ginger.	Sodium chloride.
Iron oxide.	Sodium sulphate.
Iron sulphate.	Venetian red.

But of these eighteen ingredients only six:

Gentian,	Nux vomica,
Iron oxide,	Quassia, and
Iron sulphate,	Venetian red are of value as tonics.

Capsicum or ginger is used in almost all poultry remedies. Just why, is not clear, as neither of them are of much actual remedial value. Possibly it is their stimulant action which is thought to be of benefit. Whether this artificial stimulation, particularly if long continued, is beneficial or detrimental is open to question.

Bone meal, calcium carbonate and shell may supply fowls with calcium for the bones and eggshells. The calcium carbonate and shell may also act as an antacid; that is, correct acidity or sourness.

Charcoal is very often used in poultry remedies and is probably of use as an absorbent and possibly as a food, being partially digested.

Corn meal and middlings or shorts have a food or nutritive value only.

Magnesium sulphate or Epsom salt is, as before stated, a valuable cathartic, and appears to be particularly suitable for poultry.

Sodium sulphate or Glauber's salt is also a valuable cathartic, but does not appear to be as well suited to poultry as magnesium sulphate or Epsom salt.

Sodium bicarbonate (ordinary baking soda) is an antacid.

Sodium chloride or common salt has some antiseptic action, but, on the other hand, when given to poultry in excess it appears to act as a poison. It should, therefore, be administered to poultry with care.

From this study of the registrations of live stock remedies under our old law it seems quite evident that while a large percentage of the ingredients which were used in live stock remedies may have had a value for some purpose they were of no value for the purpose intended, and that on this basis a large percentage of the money our people were paying was, even in these hard times, spent for something which was of no benefit to them.

The provisions of our new law or rather, the amendments to the old law, passed by the last legislature, provide that a copy of the label and such advertising as is proposed for the remedy shall be submitted with the application for registration and give the secretary authority to refuse registration when the mixture will not accomplish what is claimed for it. Although the new law gives the secretary authority to refuse registration when in his opinion the remedy will not do what is claimed for it, in practice the advice of experts is always obtained when there is any question as to the advisability of refusing a registration.

The new amendments also provide for the cancellation of the registration of a remedy, after it has been accepted, when it is found that the label or advertising (either printed, written or oral), of a live stock remedy, is false or fraudulent as to the therapeutic action of the remedy.

Experience under the new law has not as yet developed adequate data to form positive opinions, but as the defects of the former law were corrected and the scope of activities broadened by the amendments, there is ample reason to believe that the many decided improvements, will be of benefit both to the public and to the live stock remedy industry as a whole, and that a more perfect accomplishment of the objectives for which the law was enacted will result.

RELATION OF ANIMAL AND HUMAN HEALTH

It so happens that the health of animals may have a profound influence over the health of humans. More than a dozen diseases common to domestic animals and birds can be transmitted directly to man These include tuberculosis, anthrax, foot-and-mouth disease, malta fever and contagious abortion, milk sickness, actinomycosis, cowpox, glanders, rabies, psittacosis, food poisoning, swine erysipelas, trichinosis, and various kinds of intestinal worms. Most important among these are tuberculosis, rabies and undulant fever. These three diseases cause a tremendous economic loss to stock and cattle raisers. They constantly threaten man with the loss of health and life.—Andy Hall, M.D., Director, Illinois Dept. of Health.

Several Peculiarities in the Renal Function Among Dogs

WE GATHER, in a discussion by Maignon and Knithakis[1], a certain number of facts on the character of the renal function in dogs, facts evolved by researches into physiological "acidosis."

Volume of Urine.—When the dog changes from a diet of soup with bread, containing a small quantity of meat, to a liquid diet, the volume of urine is reduced in amount approximately 90 per cent, and that from the first day of the change of the diet. This reduction in diuresis, although very large, is not surprising. One notices, indeed, that a complete deprivation in food causes a big reduction in the amount of urine. The wastes from nutrition being reduced to a minimum (and those being at the expense of the body), less water is necessary to carry them off. We have observed in the hydrocarbon abstinence (diet of meat or fat meat) with this same animal, a reduction, which, although less in amount, is no less important, since it attains, on an average, 65 per cent. In the meat diet (boiled meat), however, the wastes from nutrition are far more important than with a diet of soup with bread. Urea, particularly, is excreted in greater abundance, and one cannot explain it, except the volume of urine diminishes. Acidosis, which appears in the liquid diet, and the hydrocarbon fasting is at least in part responsible for the marked dimunition in the volume of urine passed. By overcoming the acidosis by the administration of sodium bicarbonate in sufficient quantity to restore the normal acidity of the urine, we have seen the volume of urine double in these cases. That is, to increase from 10 per cent to 20 per cent of normal when the dogs were on the liquid diet, and from 35 per cent to 70 per cent of normal when on a diet containing no carbohydrates, but only protein and fat. But even in this latter case, we do not find the volume of urine equal that voided on a diet of soup; it is still one-third less.

There is another factor in this worthy of attention. In all these experiments the animals were allowed water freely. With a healthy subject receiving uniform feeding, one would expect to find a urinary excretion equally uniform, in urea, phosphates, chlorides and other substances. It is not the case. The excretion is irregular, leading us to assume small, temporary retentions, followed by discharges. The dog appears to possess to a higher degree than other animals, this renal instability. Attention was drawn to this fact by A. Lumiere and Chevrotier as early as 1903.

In our experiments, we verified this irregularity of excretion; we also established averages for a period of six to eight days. Apropos of the excretion of the acetone bodies, we observed plainly on a subject submitted to a meat diet, a phenomenon of retention, followed by a discharge, produced by bringing back the urinal acidity to normal by the administration of sodium bicarbonate (Experiment XV). The acetone excretion, which had abruptly increased at the beginning of the administration of sodium bicarbonate, diminished after a time. On another animal (Experiment XVI), nothing of a similar nature was observed. The meat diet produced an acetone excretion much stronger, an absence of a reserve is seen, and the administering of sodium bicarbonate, instead of increasing this excretion, diminished it slowly. We have observed in effect, as much in the liquid diet as in the hydrocarbonate abstinence, that the neutralization of urinary hyperacidity by administering sodium bicarbonate, causes a modification of duction of acetone bodies.

the metabolism, which tends to a lesser pro-

It should be pointed out that the dog which presented this phenomenon (Experi-

[1] Maignon, Prof. F., and E. Knithakis; Quelques Particularités de la Fonction Rénale Chez le Chien; *Revue Pathologie Comparée et D'Hygiene Générale;* 5-20 July, 1930, pp. 795-799. Abstracted by J. G. Horning.

ment XV) of retention followed by discharge, showed likewise a phenomenon of habit, already pointed out by Marcel Labbe in the abstinence in man. At the end of three months of meat food the acetone excretion had come down again to the level of that of a soup diet. In experiment XVI, on the contrary, there was no retention, or no such habit. It is difficult to say whether these two phenomena are connected.

This retention of acetone bodies observed in the dog No. XV on the meat diet, cannot be considered as pathological. The dog being a carnivorous animal, the meat diet is for him a normal diet. This is shown by the small retentions followed by discharges in the course of urinary excretion that one observes as a normal condition with all species and particularly in the dog. It would be interesting to know the causes of these phenomena. Perhaps they would enlighten us on the mechanism of retentions far more serious and sometimes of very grave concern in pathology.

MILK IN THE SUMMER TIME

The sturdy country-side needed no scientist to declare with an air of discovery that milk is one of the most important of foods. When man first cast his lengthening shadow across the horizon of history he was leading a cow followed by a dog and driving a flock of sheep. Already the cow was equipped with a bell and long before the poet discovered the fact she returned at night from the green pastures. The Children of Israel were willing to follow Moses for forty years through the hardships of a rigorous experience in the wilderness because he held before them the promise of a land flowing with milk and honey. In the light of this evidence of satisfactory mass experience of universal humanity there was no need for an expert to spend months and years to prove that milk is an exceedingly important if not essential food for man.

Like all good things, however, milk can be and often is contaminated. In the discovery of this fact and the development of practicable measures to protect milk, the scientist has accomplished an invaluable service to mankind. As soon as a man undertakes to collect and distribute milk in order to increase his wealth, he is beset by a host of difficulties. Not least among these is the danger of contaminating the milk with disease germs. The natural habitat of disease producing germs is the human being. He carries these germs about with him wherever he goes. If he handles milk, he must practice the most rigid habits of cleanliness and hygiene in order not to contaminate the milk. The dairyman must do more. He must see that disease germs from his customers take advantage of no opportunity, say through unsterilized bottles, to get into his milk.

Since perfect prevention of contamination is extremely difficult, a secondary line of defense is needed to insure the safety of milk. This is found in pasteurization. Properly performed, pasteurization eliminates all danger of communicable disease from milk.

Safeguarding milk is particularly important during the summer months. This is indicated by the seasonal appearance of milk borne epidemics. Out of 37 milk borne outbreaks recorded in the United States during 1931, all but four took place during the late spring, summer and early autumn.—*Illinois Health Bulletin.*

An outbreak of an infectious ophthalmia in sheep in New South Wales was observed by Grahame. The disease was transmitted to healthy sheep by instillation of a drop of lachrymal fluid from an affected sheep. The disease was transmitted from sheep to sheep on tall grass pasture. Various bacteria were isolated from affected sheep; but none of them proved pathogenic. Because of an increased resistance of recovered sheep, a filterable virus has been suspected as the cause.—*Bio. Abst.*

India's Veterinary Activities

By GEORGE CECIL, Paris, France

VETERINARIANS in torrid India are represented by the officers of the Royal Army Veterinary Corps, a few European veterinarians who earn their living in Calcutta, Bombay and Madras, and thousands upon thousands of "salutris," as the colored practitioners are known. Occasionally, a half-caste, greatly daring, sets up in practice to eventually seek another walk in life, and to his advantage, for the Eurasian is not intended by nature to cope with the ailments of suffering animals; the inattentive fellow cannot even be depended upon to shoe a horse properly, while he rarely has faced a course of study. Pedro, who is of black and tan complexion, in desperation, turns missionary or poet.

The Royal Army Veterinary Corps officers serve five years in the sweltering East, with leave, on full pay, to England once, or, with luck, twice, during their Indian service. Those who become acclimatized, exchanging with a brother officer, who fears sunstroke, fever and cholera, stay on for another five years of India and its drawbacks. Others attracted by the Indian rate of pay, remain and hope that no untimely happening will prevent their retiring and drawing a pension. Some, having outgrown England and home ties, finally settle down in the cool Himalayas as country gentlemen. Many quit India at the first opportunity.

A few years ago, before Delhi became the official capital, a young R. A. V. C. officer, persuading himself that "rupees" could be made by a qualified civilian veterinarian, resigned his commission and opened a combined horse-dealing and veterinary business in Calcutta. A hasty decision was followed by ample leisure in which to repent, for within twelve months of launching out, he was obliged to file his petition. Thus did vaunting ambition o'er leap itself, and it doubtless will continue leaping till doomsday.

Another officer, after serving twenty years in the Corps, and putting by a tidy sum, retired on a pension and bought a partnership in a well-established Calcutta business. Knowing many riding and racing men, countless horses and ponies changed hands to his advantage. He is a first-rate veterinarian. Fortune smiles upon him.

A Job Worth Having

The duties of the R. A. V. C. officers are limited and these non-combatant warriors are not overworked. They have veterinary charge of cavalry regiments (British and Native) and batteries, a senior veterinary officer being held responsible for the equine health of the "station." The S. V. O. is assisted by several officers, whom he rules with the traditional rod of iron, or treats amiably, according to his nature. There also is an Inspector-General, who, descending periodically on each cavalry and artillery "station," inspects and reports—sometimes to his subordinates' detriment. Few are sorry when the Inspector-General has departed, since official visits often prove upsetting, especially to easy-going officers.

The activities of the Corps also extend to various Remount Depots, where breeding takes place, the mounted branch of the Indian army being supplied with chargers and transport horses from these centers. The Remount Officer draws special pay, a stud of horses is placed at his disposal and free quarters allowed him, consisting of a more or less palatial, furnished bungalow—complete with a kitchen garden. The staff includes a number of non-commissioned officers and many "saises" (native grooms), who exercise the horses and rub them down. Colored helpers clean out the stalls, a lynx-eyed sergeant keeping an eye on them meanwhile. Indians of the "coolie" type cut grass in the nearest jungle. Everyone is kept busy; all fear the Inspector-General's visit.

Should illness overcome the garrison, the milk supply is at once suspected, a veterinary officer being detailed to examine the cows, their fate depending upon his verdict.

The goats, which provide both milk and flesh for Mahometan troops, also have this professional attention paid them, and much to their native owners' annoyance, especially when sick "bukris" are condemned, slaughtered and buried in quick-lime. The authorities take no chances.

Mountain battery and transport mules are on the veterinary officer's charge. These unruly brutes enjoy good health during the cold weather, as winter is known; but no sooner do the rains set in, than skin disease attacks them, and with disastrous results. The whole Royal Army Veterinary Corps may fail to cope with the malady.

"Buksheesh"

Sporting Europeans, when first making India's acquaintance, sometimes belittle the native veterinary surgeon, declaring that no "salutri" equals the white practitioner, that Ram Chunder does not know a splint from a saddlegall. Occasionally he diagnoses incorrectly, severe lameness being treated as though it were a trifling strain; the decoction which is applied, if quite harmless, is useless. Yet, Ram Chunder manages to cure many an equine ailment, such as colic, thrush, inflamed eyes, "bursati," cracked heels, and so forth. In stations where there is no white veterinarian, none can avoid employing him.

The "salutri" also tackles corns, malanders, capped hocks and "broken knees," to which powdered indigo (his greatest standby) is applied. He earns many a fee, varying from a "rupee" to fifteen times as much, for examining a horse which is about to change hands, the amount depending upon the seller's reputed means. "Rajahs" and other Indian potentates being rich beyond the dreams of avarice, are faced with a demand for a hundred rupees, Ram Chunder knowing that, in addition to having to wait a long time for payment, at least half the fee must be debited to "Buksheesh."

In the sun-baked East, no account is settled by natives till everyone concerned, no matter how indirectly, gets something out of the money bag. "Buksheesh" is lord of all, by Allah!

Ram Chunder has long been an expert clipper, and he may be depended upon to hog a mane and to trim a nag's tail symmetrically. When, however, shoeing operations are undertaken, it is advisable for the knowing owner to be present. The "salutri" is apt to damage the frog, and the odds are that he will cut away too much of the hoof, besides fitting the horse or pony with a shoe too small, lameness being the result. Still, Ram Chunder is necessary; few can afford to dispense with his services.

The native veterinary surgeon is a great believer in the leaves of the "neem" tree, using handfuls of them for poultices, when lameness has to be cured. With powdered indigo and "neem" leaves, he often does all that is possible; skin disease and sprains are put right. The "rupees" are well earned.

Within recent years several veterinary colleges and serum institutes have been established in India by the British government, where native Indians are given instruction in veterinary science. In the colleges a regular course in veterinary medicine, fashioned after the courses in European veterinary colleges, is provided. Native graduates are employed in the animal health branch of the Provincial Departments of Agriculture. It is too early to say what the efficiency of these native graduates will be in animal disease control. Certain it is that the animal disease situation in India furnishes ample material to engage the attention of all, including R. A. V. C. officers, civil veterinary officers, native veterinarians and salutris. This year's graduates at the Madras Veterinary College numbered 39 and at the Bengal Veterinary College, 34. Owing to retrenchment in government expenditures there are no official positions available for them.

TETANUS ANTITOXIN FAVORABLY AFFECTS MENINGITIS

Under the titles of: Botulism in the Horse, VETERINARY MEDICINE, page 141, issue of April, 1930; Forage Poisoning in Horses, VETERINARY MEDICINE, page 243, issue of June, 1930; Meningitis in Horses, VETERINARY MEDICINE, page 142, issue of April, 1930; Outbreak in Saskatchewan, Canada, Borne's Disease, VETERINARY MEDICINE, page 243, issue of June, 1930;

Kansas Plague, Paralysis of the Pharynx Blind Staggers, Mad Itch; there has been described by field practitioners, University pathologists and the text book writers of veterinary medicine a disease which seems to be very widely disseminated over that part of the world accessible to civilized man.

Several years ago the writer became impressed with the similarity of symptoms given and conditions under which the diseases developed as reported by the various writers under these different titles. Personally my first introduction to the disease was at Louisville, Ky., under the names of Blind Staggers and Paralysis of the Pharynx; this was forty years ago. Since that time it has been my lot to meet with it in several states of the U. S. A. under some of its various names. The disease is produced by a living wiore-organism, which develops on grasses which grow in deep or inundated lands, following a drouth-drying out of these lands. When grazed by animals or cut and cured for hay the grasses prove the medium of transmission. It is not inoculable from one animal to another.

Twenty years ago there was brought to my veterinary hospital at Macon, Ga., a typical case—we will call it Blind Staggers—patient stepping high, nervous-twitching muscles—vision impaired—could not judge distance or remain quiet—head turned to left side—tendency to go to left when walking—unable to swallow water or food—pressed head against wall of stall—breathing rapid—pulse accelerated—temperature 101 F. The patient was a bay gelding. He was placed in a box stall, no treatment given—as none curative was known. This was done on a Saturday, late in the afternoon. The next morning to my surprise, he had his head over the half door of the stall asking for his breakfast—to all appearances he was sound—examination revealed naught—rather puzzling—each day examination revealed no change from normal until the following Tuesday noon when he showed a typical case of tetanus exaggeratedly developed and died of tetanus the night of the following day.

From this case the writer took the cue and found that tetanus antitoxin was the curative agent for so-called Blind Staggers, Pharyngeal Paralysis, Cerebro-Spinal Meningitis, Mad Itch, Botulism, Kansas Horse, Plague-Borna's disease—all of the horse—and the cerebral or nervous form of hemorrhagic septicemia (mad itch) in cattle. There is no doubt but it would be equally effective in the other three forms of the latter in cattle and possible in sheep. While the organisms causing these various diseases may not be identical yet on the whole they are so near akin that cross immunization obtains and they are amenable to the same curative agent.

The initial dose make small to avoid shock—250 units—then give 5,000 or even up to 25,000 units in two hours and so on as case seems to indicate. Give either intra-venously or intra-muscularly. Success lies entirely with the judgment of the practitioner as to the quantity to be given. The action of the curative agent (tetanus antitoxin) is positive. It has proved so in my hands for twenty odd years.

John Rutherford Anderson, D.V.S.
Macon, Ga.

Comment: It seems not out of place to point out that the categorical statements of the author in the foregoing do not fulfill the requirements for recording clinical observation; particularly is this true when referring to pathology not well understood or upon which there is a wide divergence of opinion. It leaves unanswered questions as to nomenclature, diagnosis, cause, symptoms and the percentage of recoveries with and without the line of treatment advocated. Without such data the reader must assume conditions to which the discussion applies and there is no certainty that the assumed conditions will be the same as those the writer has in mind.—Ed.

Random Case Reports

By FRANK G. ATWOOD, New Haven, Connecticut

HEREWITH find a report of a few surgical cases which I hope may interest readers. The drugs and surgical material used in these operations were almost entirely Parke, Davis & Company's products, for which I have a personal preference because of their reliable and uniform quality.

Fig. 1. Colt six weeks after the tenotomy operation. Both front legs were operated upon

Contracted Tendons in a Colt

Fig. 1 shows a colt that was born with the tendons in both front legs slightly contracted. After regular treatment had been used for about one year, we decided that it would be necessary to perform tenotomy on the perforans tendon in both front legs.

Fig. 2 shows this operation in progress. The hair was clipped off both fore legs over the field to be operated on and scrubbed with Neko Antiseptic Soap (P. D. & Co.) then injected with 2cc of adrenalin and cocaine solution made by dissolving one tablet in 1cc of water. The instruments were properly sterilized and an incision made over the perforans tendon. A blunt probe was then passed under the tendon and more of the adrenalin and cocaine solution injected. After this the tenotomy knife was placed under the tendon and it was severed by cutting outward.

In Fig. 3 the foot is being pulled out to its fullest extent with a rope to bring it into proper shape. This caused the severed tendon to gape about one inch. Absorbent cotton was then placed over the wound and

Fig. 2. Severing the perforans tendons of a yearling colt to relieve congenital knuckling

a bandage, soaked in a germicidal solution prepared by adding one large Germicidal Disc (P. D. & Co.) to one pint of water, was applied over the cotton. Recovery was complete as shown in Fig. 1.

Ovariotomy in a Cat

Fig. 4 shows an Angora cat being spayed under the influence of Chloretone (P. D. &

Fig. 3. Breaking down adhesions and bandaging

Co.). Two five grain capsules were given to this full grown cat, and in half an hour it was under the influence of the drug suf-

ficiently to enable us to clip and shave the field of operation. The parts were then cleaned and scrubbed with Neko Germicidal Soap and washed with alcohol, after which an incision was made through the skin. The edges of the severed skin were separated and an incision made through the muscles and peritoneum. A spreader was used to bring the horns of the uterus into view. The horns were pulled up through the incision and the blood vessels tied and the cornua

Fig. 4. Spaying a cat—median line incision

and ovaries removed. In order to avoid the removal of stitches, ten-day cat-gut was used to suture the peritoneum and muscles. A cotton pack soaked in the antiseptic solution, already referred to, was placed over the incision and held in place with a 3-inch bandage with instructions to the owner that the bandage was to be kept in place for seven days and the animal fed lightly for a week. In spite of the fact that some veterinarians consider ovariotomy more or less of a risk in cats, I might say that I have operated on hundreds of cases without loss.

Cesarean Operation in a Boston Bull Terrier

Fig. 5 shows a valuable Boston Bull Terrier undergoing a cesarean operation. This made the fifth time this matron had had a cesarean operation. There were considerable adhesions resulting from previous operations.

Fig. 6 shows this matron and her three pups five weeks after the operation. One of these pups was to undergo the same operation 18 months later as told in the next case.

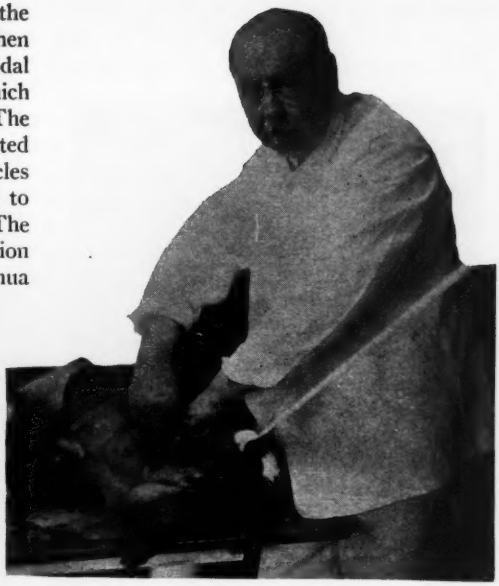


Fig. 5. The fifth cesarean operation on a Boston Bull Terrier

Cesarean in the Second Generation

Fig. 7 shows one of the puppies shown in Fig. 6 and her three puppies that like their mother, were brought into the light via a cesarean. Following the cesarean operation

Fig. 6. Boston matron shown in Fig. 5, and puppies five weeks after cesarean section

on this matron, she had an attack of eclampsia (see Fig. 8) caused by the vigorous pups nursing too much. A half-grain of morphine

Fig. 7. A matron, one of the puppies shown in Fig. 6 and her puppies all in the best of health after a cesarean operation. As two of the puppies are females the prospects are good for more cesareans

sulphate was injected subcutaneously and a cold water enema given. The pups were taken away from her and thereafter returned only for nursing, six times daily. She made a complete recovery—Fig. 7.

Successful Use of Theelin

Last winter I was called to treat a matron Pekingese which had been bred several times but had failed to conceive. I recommended P. D. & Co.'s Theelin, a crystalline ovarian follicle hormone, and supplied a quantity to

Fig. 8. Matron shown in Fig. 7, suffering from eclampsia

be given. We found it necessary to breed a little earlier in the heat period than common. This was no doubt due to the action of the ovarian hormone. We allowed the stud to mate twice on the ninth day and on the twelfth day and took pains to time the mating, as the service is no good unless the animals are locked together at least 18 minutes. The spermatozoa do not start from the male until they have been locked twelve minutes and then it is necessary for them to be in this position at least six to ten minutes longer. Twenty minutes is a good time for service in the dog. Many breeders desire to favor their studs and will in a general way pass it off that if they are locked in the mating ten minutes this is enough time. This is not safe time, they should be timed and it should be as near twenty minutes as possible to arrange same and if it is under fifteen minutes it should be repeated in two days and the short time considered of no value.

The Pekingese conceived from this service and in due time gave birth to four puppies, and although they were small, all lived and did well.

"BALLARDS" SNOW LINIMENT

Ammonia carbonate (Squibbs)...℥ i
Aqua .....℥ viii
Mix
Castile soap, white.....℥ vi
Aqua (Hot) .....O i
Dissolve the soap in the hot water and add to the above. Shake.

Gum Camphor .....℥ i
Spts. Vini. Rect.....℥ i
Break up the gum camphor in the alcohol and add to the above. Shake.

Add Spirits gum turpentine ℥ i. Shake.

Add a little more turpentine until it adheres to side of container.

The above formula is called "Snow Liniment" because it is so white and like cream. It is used extensively by veterinarians hereabout. Druggists have it for sale at 25c for two and one-half ounces. It can be made for 25c a quart. It is sold generally for $2.75 a gallon.

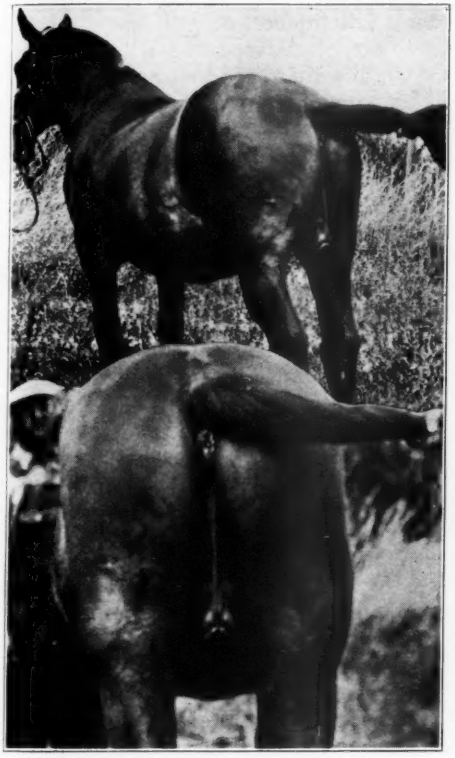
I am a druggist of 50 years experience. The formula is a good one, much used by veterinarians.

O. H. Hand.
Sunset Beach, California.

A HERMAPHRODITE WITH NEUTRAL SEXUAL TEMPERAMENT

The equine hermaphrodie shown in the accompanying illustration was called to my attention by Doctor Byam, of Clarkston, Washington. It is ten years old, light bay, weight about 1500, fat and is used for everyday work on a fruit ranch. It is quiet, tractable, and has never shown any signs of sex activity.

There is a well-developed udder, with two normal teats. The vulva, or vestige of one,



Equine hermaphrodite with sexual characteristics of a gelding. Works quietly, keeps easily, an entirely satisfactory work animal

is rather low, and hanging down from the posterior commissure, is a penis, through which the animal urinates. A rectal examination revealed two round bodies where the ovaries should be, but what they are, we do not know.

Williams in his work on "Veterinary Obstetrics," page 127, describes the usual hermaphrodie as vicious, somewhat like a cryptorchid, but this animal is quite different.

From the general appearance, it looks as though the embryo had started out to be a female. Then, through some quirk in nature, the characteristics of both sexes appeared, and the mature animal turned out to be a neuter. As it is neither Republican or Democrat, the only explanation we can give, is that it belongs to the third party.

We were told a couple of old gold miners were walking along the streets of Lewiston, Idaho, just across the river from Clarkston, when they ran across this animal, hitched to a wagon load of fruit. They looked at the placid animal, and then looked again. Finally, one said to the other:

"Lem, I'm offen that there moonshine fer life."

Our trusty graflex bears mute testimony to the veracity of our statements. In our 23 years of practice, this is the first case of the kind we have ever seen.

E. T. Baker.

Moscow, Idaho.

HALF OF MENTAL DISEASE CAUSED BY FOCAL INFECTION

Half of the patients in hospitals for mental disease owe their illness to definite changes in the tissues of their brains brought about by chronic infections of teeth, tonsils, sinuses or digestive tract, in the opinion of Dr. Henry A. Cotton, director of research at the New Jersey State Hospital. By eliminating the chronic infections in these patients, Dr. Cotton and associates were able to double the number of recoveries at the hospital during the last thirteen years. Two thousand instead of one thousand patients recovered during that period. Incidentally the state saved for at least six years $1,000 a day for the maintenance of these patients, leaving out of consideration the large amount saved in cost of construction of a new building to care for that number. —*Science.*

Some Sheep Diseases I Have Met

By E. T. BAKER, Moscow, Idaho

IN A rather varied experience with sheep maladies, the writer has always kept in mind the scientific classification of ovine ailments as told to him by an old wool grower in southern Idaho. This gentleman, while not very long on "book larnin'," was a hard headed old fellow who had been up against everything from scabies to blizzards. He was a pioneer when the West was young, and had been a pony express rider, miner, farmer, stock raiser, buckaroo, and finally, for many years, had been in the sheep business. Unburdening himself, he proceeded to enlighten me along these lines:

"When we gits a bunch of sheep trouble, they is jest three things t' think of: Fust, it's ketchin'; second, taint ketchin', an' third, damfino!"

Complications Baffling in Sheep Practice

Now many a college professor has spent hours in explaining and exhorting to his protégés just what the old sheep man expressed in a very few words. And many a well-trained veterinarian has wrecked his reputation on sheep diagnosis through lack of practical experience, and not being willing to listen to some older and wiser head. There are so many baffling complications entering sheep practice, just as many a middle west hard working practitioner has discovered, trying to fathom the difference between cholora, so-called flu, swine plague, hemorrhagic septicemia, internal parasites and a dozen or so other maladies, which do nothing but cause breaks. Add to this, the sheep's natural low resistance to disease, ignorance on the part of the owner in many cases, unsanitary surroundings, and you have a mix-up that requires some real brain work, with a combination of luck.

Details Veterinarians Should Know

As a practitioner, do you know what breeds are black-faced and white-faced? What is the difference between a B-type of Merino and an A-type? What breeds have horns? What is the average weight of a sheep, and which breeds are the largest? How can you determine the age of sheep in a general way? How would you catch a sheep for an examination? What is the difference between hair and wool? How large is the average western "band" of sheep? What is a "bum" lamb? Can you give a few details regarding the care, feeding and raising of sheep in general?

For Example

Suppose you receive a call tomorrow morning out to Farmer Smith's, who lives on the old McFeeter's ranch, to see some sick sheep. Now Smith is a great sheep fan. He likes sheep, and has found them to be a profitable sideline to his farming operations. When anyone makes a trip to his place, he always shows them his sheep, and takes great pride in them. He has a small bunch of Shropshires, and has learned all he can about his particular breed, their history, noted family names, and many other interesting details. Suppose when you reach there, you don't know what breed they belong to? Suppose the hired man asks you how long is the period of gestation in a ewe? Then, old Grandpa Smith hobbles out and asks you if you don't think the worm in the foot is on the bum, and if blue bag in ewes can be cured up, and is salts as good as "ile"? Then as you grow dizzy,

Mrs. Smith comes out and wants to know how is the best way to prepare cow's milk for an orphan lamb, and would you add sugar and water or give it straight?

Sorry You Don't Know

About this time you wish you had neglected the Elks Temple last winter long enough to have looked up a few of these fundamental facts about sheep. You try to think of a book or two on animal husbandry, feeds and feeling, sheep diseases, and veterinary pathology, and wonder if you know enough to talk intelligently to the six year old son of the Smith family. If you fall down now, the gossip will sweep over the entire neighborhood: "Well, Doc Killam knows all about horses and cows and hogs, but he don't know beans about sheep!" Then the county agent steps in, recommends himself very highly as a sheep expert, and your practice along that line has gone glimmering.

Necessity Compels Attention

The writer did not take up ovine pathology as a specialty, but was pushed into this work with a loud splash that he will never forget, even though he should live long enough to wear out two sets of sheep glands. When fresh out of college, and with a very vague idea that a sheep was a white animal with wool on the outside, he was suddenly called to investigate an outbreak of disease among a large band of sheep. It was forty miles from a railroad, and nearly a hundred to the nearest veterinarian. If you want to feel lonesome and homesick and disgusted with the veterinary profession in general, picture yourself in the same predicament. Another thing, which added to the festal occasion, was that one of the regents of the college from which the writer derived his small remuneration in those days was owner of these sheep, and he wanted to know what ailed them. He didn't care a whoop about scientific theories; *he had lost four hundred* already, and wanted to save the other sixteen hundred.

Saved by Plea for Time

"Ef they was any pizen plants around here, I'd think it was camas, an' if any of these here ranchers had it in fer us, I'd be lookin' fer saltpeter or strychnin," said the camp tender to me.

"We lost a couple lambs here last summer right on these here beddin' grounds, but that was all," added a herder.

Then the owner looked at me like I was going to raise the dead, and bluntly asked:

"What do you think it is?"

Fortunately, the cool mountain air had stimulated my almost paralyzed cerebrum to feeble activity, and I sparred for time:

"I won't be able to say until I make a complete examination." This was what saved me from getting put out on first base, because I knew absolutely as much what ailed the sheep as the wall-eyed Australian sheep dogs. If you have ever tried to crawl up the inguinal canal of a cryptorchid, and all you could palpate was "guts," you know just exactly how I felt.

However, supper time came on, and we sat down to a hearty meal of sour dough biscuits, fried ham, canned goods and plenty of good, strong coffee. In a few minutes the world seemed a great deal brighter, but there were still dead sheep scattered all around us which took all the joy out of life. We could see in almost every direction snow-capped mountains, although the time was July, and most people—except the writer—were in those regions enjoying the scenery.

Felt Like a Pitcher with Bases Full

To make a long story considerably shorter, after the first postmortem examination, we knew almost as much as we did before beginning the operation. Outside of getting a little wool and sticky blood scattered over our ears and pants, the autopsy findings were absolutely nil. True, there were blood vessels, and discolored tissues and plenty of gas, but no part of the carcass seemed to show any classic pathological conditions that would

enable the "expert" to point them out and say: "Thar she is!" Nothing of the kind happened. I knocked in vain at the door of my so-called trained mind, but there was nobody at home. I felt like a pitcher with the bases full and the head of the batting list coming up. Although that was twenty years ago, those minutes still remain vivid in my memory.

Black Leg, B'Gosh!

Thousands of other cases have come and gone and are forgotten, but not that one. I walked over to a group of dead lambs, and made a bluff of examining them superficially. I passed my hand over the rump of one of the victims, and felt a crinkling of the skin, much like blackleg in calves. But who ever had heard of blackleg in sheep? It was not in the books in those days, consequently it could not occur in nature. I examined more, and nearly all had this peculiar "butter wrapper" crinkle. Examining more closely, I found clots of black blood in the muscles, and the loose connective tissues full of gaseous bubbles, just like in calves. Making a bold stagger, I told the owner it looked very much like blackleg, although it was a very rare and peculiar malady in sheep.

Harangues the Awe-Stricken Throng

Gradually, as if in a dream, the salient facts about this rather common bovine disease came back to me, and I gave the assembled throng an imitation of a regular college lecture. We next drove the sheep over to clean bedding grounds, and left on horseback at dusk to the nearest long distance 'phone to order blackleg vaccine.

Quick Work Saves the Sheep

The next day a thousand doses of black leg powder, prepared by the government, arrived, and we rode back to the sheep camp. How to prepare it for lambs and sheep was the next problem, but figuring a sheep ought to stand half the bovine dosage, we began to mix up 1600 doses. Using a much battered tin pan for a mortar, a heavy spoon for a pestle, and spring water for a vehicle, we finally mixed it. I had a two cubic centimeter hypo-syringe—and still use it—so I roughly guessed it would take three-fourths of a gallon of water.

A knowledge of the metric system, keeping in mind that 4000 cc. make a gallon and a pint is equivalent to 500, saved the day for quick work.

We used an old tin can that had formerly contained peas, and which announced its net contents as one pint.

In other words, the vaccine was perfectly sterile. Making a table about three feet high by rolling logs together, the herders and owner began catching sheep and setting them up on the table.

Couldn't Decide Where to Inject the Stuff

I had never seen a sheep immunized with anything before, so the question of where to vaccinate came next. Remembering where we had immunized hogs and dogs, I figured the inside of the thigh would be all right, and so it proved. We worked all that day and part of the next, and if ever anyone's fingers were sore or wrists were tired, they were only exceeded by the backs

of the herders who had lifted sixteen hundred heavy lambs and ewes up three feet.

Burned the Carcasses

Then we dragged the carcasses of the deceased in a large pile, built a bon fire of crackling red fir and spruce boughs, and burned them as well as we could. The next day, after immunizing, several lambs were found dead, and I was pretty uneasy. But the day was bright and sunny, and the mountains full of feed, and they came in that evening seemingly contented, and only a few even limped from the vaccination.

Stopped Dying Promptly

Whether it was unadulterated luck or due to the vaccine, not another lamb died. Before long, when sheep men had an outbreak of trouble, they began sending for me, and in order to keep at all informed on the subject, it behooved me to learn all I could about the practical side of sheep diseases.

Plant Poisoning Hard to Differentiate from Contagions

The most difficult problems to diagnose in large bands of sheep in the west, is to differentiate between an infectious disease or plant poisoning. Of course, it is comparatively simple when a trainload of sheep are unloaded hungry and turned out on a mountain side, and later find death camas. It is the outbreaks where no apparent cause can be found, and where the clinical symptoms and autopsy findings are all jumbled up. Some men may be able to point with unerring accuracy what the trouble may be from the pathological findings, but the writer is not one of those geniuses.

Breed Susceptibility Varies

In order to examine sick sheep intelligently, in addition to veterinary training one should have a fair knowledge of the breeds and their various peculiarities. For example, we find much blindness among Cotswolds, due to their long forelocks. Snuffles is extremely common among Lincolns. Romneys are very free from foot troubles.

Just like we expect to find sore legs in Shire horses that are very difficult to cure, we find different ailments in certain breeds of sheep.

Other Determining Factors

The sex is another factor. In a band of bucks or wethers, we usually find a large amount of urinary troubles. We expect to find footrot or pneumonia in wet or disagreeable weather.

Following deep snows come pre-parturient apoplexy, due to lack of exercise.

Early spring brings an abundance of bloat, and the autumn its share of founder.

Certain sections have their common parasites or poisonous plants.

In puzzling outbreaks make a few smears or send in specimens to a laboratory. This often confirms a hazy clinical diagnosis.

Use the axillary space for hypodermic injections. Use a short needle. In large bands, one can work in a chute, and can immunize around 1500 a day without much trouble.

In other words, keeping in mind the breed, sex, season of year, prevalence of parasites or poisonous plants and past outbreaks of infectious disease, together with autopsy findings, we may be reasonably certain of our clinical diagnosis.

Outline of Diagnosis and Control of Common Poultry Diseases

By FRANK BREED, Lincoln, Nebraska

THE following outline is intended to assist in the diagnosis of the common poultry problems. The descriptive matter gives the clinical symptoms together with the mode of discrimination and some of the means of control, while the tables contain summaries of the outstanding clinical symptoms and autopsy findings.

It must be remembered that this is only a working outline, showing only the salient symptoms and pathological changes encountered in these conditions.

Fowl Cholera—Avian Hemorrhagic Septicemia

A disease of the fall and winter.

Incubation Period—From 12 hours to three or more days.

Symptoms—Depression; the face, comb and wattles usually become darkened and discolored; there is increased thirst; the respiration is increased and later labored; some elevation of temperature; complete prostration just prior to death; sometimes death is so sudden no symptoms are manifested.

Symptoms and Lesions—Drooping wings; lameness, (localized cholera); swollen joints, (localized cholera); emaciation, (chronic cholera); diarrhea, (white discharges); elevated temperature; congested, deep-red comb; congestion and hemorrhage of intestinal mucosa, congested lungs and kidneys; petechia on the heart.

Mode of Spread—The organisms are eliminated from the body through the bowel discharges, contaminating the soil, feed and drinking water.

Control—Strict policy of isolation of sick birds; cleaning and disinfecting of houses and premises and the use of germicide in the drinking water. The treatment, of sick and well birds with immune sera, has been tried with success in some instances. Vaccination against the disease may produce a temporary artificial immunity, but conflicting results have been reported on this method of treatment. (Kaupp.)

Fowl Typhoid (Klein's Disease)

A disease of the autumn and early spring.

Incubation period four to six days, and the duration of symptoms in fatal cases from four to twelve days.

Symptoms—In the initial stages, the symptoms may be overlooked if the birds are not alarmed. The bird shows signs of dozing, and does not present the normal facial appearance if disturbed, the action of the head being of a nervous type. If disturbed the bird shows a weakness of gait. The bowel discharges are sulphur-colored and the temperature as high as 114° F. Loss of flesh may be rapid; affected birds may become partially comatosed; and if sitting, the head may fall forward until the beak touches the ground; or the coma may be complete when the bird lies on its side with the head curved under its breast; complete loss of the use of the muscles of the neck and inability to walk. The face, wattles and comb usually are highly anemic.

Autopsy Findings—Grayish spots on the heart; severe intestinal catarrh; enlarged liver showing white spots; spleen enlarged; kidneys enlarged.

Mode of Spread—The infectious organism is eliminated in large quantities by bowel discharges; contaminating soils, feed and drinking water. The disease may be introduced into a flock by the addition of new fowls or eggs, and by birds eating carcass of birds dead of the disease.

Control Measures—Strict sanitation is to be recommended; all sick birds should be isolated or destroyed; an antiseptic should be added to the drinking water and the healthy birds removed to new grounds if possible. Epsom salts administered to the

flock is commendable. The use of a bacterin prepared from the fowl typhoid organism or a combination of the typhoid and cholera organisms have given satisfactory results.

Tracheitis—Infectious Bronchitis—Laryngotracheitis

An acute infectious disease most common during the spring and autumn, especially at concentration points for shipping and in fattening batteries. This condition may spread very rapidly from battery to battery.

Symptoms—A rattling sound may be heard in the region of the trachea or bronchi. The affected bird will be seen to extend the head upwards with the mouth open gasping for air. Pseudo-membranes may form in the mouth, which may have the appearance of canker. As the disease progresses, the appetite is lost, fowl becomes dull and loses in flesh.

Autopsy Findings—Hemorrhagic inflammation of the trachea with an exudate and bronchitis.

Treatment—One grain quinine sulphate three times daily. Place the bird in *warm*, clean comfortable quarters, free from drafts. Give plenty of clean water and soft feed such as bread or middlings moistened in milk, to which has been added two grains of black antimony for each bird. Feed twice daily. In the early stages, the disease may respond to subcutaneous injection of 3cc to 5cc of a solution of acriflavine, repeated once a day. (Kaupp.)

Avitaminosis

Vitamin A is a fat soluble vitamin and its absence from the diet results in a condition known as "nutritional disease." The development of this condition is rather slow. It has been found, by experiments, that it requires about 158 days to develop a typical case of nutritional disease, when the birds are fed on a diet entirely lacking this vitamin.

Symptoms—There is a loss in weight; the comb becomes pale, the feathers ruffled, and the birds show progressive weakness. In the late stage of the condition, diarrhea may be observed, the droppings containing considerable white material (urates). The eye usually shows involvement, which is manifest by a pronounced swelling; the exudate is white and does not have an offensive odor. This affection should be differentiated from ocular roup, in which the exudate is yellowish and accompanied by an offensive odor.

One of the most important diagnostic factors in this condition is the presence in the esophagus of small white or yellowish raised nodules of about the size of a millet seed. These may be few or many in number and located near the upper end of the esophagus or over the entire surface. The kidneys are usually involved in this condition. They appear large, pale in color and streaked with a network of white lines. The network appearance is due to excessive urate deposit. In some instances the urates may be distributed throughout the body and the surface of internal organs appear as if sprinkled with a white powder.

Autopsy Findings—White cheesy pustules in the esophagus and white deposits (urates) on the heart, liver and kidneys. There is congestion of the latter organs.

Treatment—This consists entirely in correcting the diet. This vitamin is present in large amounts in butter, yolk of eggs, green leaves, cod-liver oil, yellow corn, and good, leafy alfalfa.

Polyneuritis

Vitamin B, which is water soluble, when lacking in the diet, results in a condition in fowls called polyneuritis. It appears that the bird reacts much quicker to the lack of this vitamin, than to lack of vitamin A. It has been shown experimentally that birds will develop polyneuritis and die in 54 days when kept on a diet deficient vitamin B.

Symptoms—The affected birds exhibit extreme nervous symptoms and inability to coordinate certain muscular movements. Sometimes a paralysis of the legs and a slight paralysis of the muscles of the neck develop. Eye lesions are lacking. The loss of muscular coordination is not so pronounced as in botulism or limberneck and the development is slower. The feathers present an unthrifty or unkempt appear-

ance; the wings droop; emaciation ensues and the temperature is subnormal. There are no lesions of the abdominal or thoracic organs.

Treatment—This consists entirely in correcting the diet. This vitamin is present in yeast, milk, green leaves, eggs, fruits and the coverings of most grains.

Rachitis

Vitamin D, fat soluble, plays the all important part in the proper development of the bony structure of the growing fowl. A deficiency of this vitamin in the diet results in a lack of proper assimilation of lime salts which results in rickets.

Symptoms — Swollen joints, lameness, stiffness, lack of growth, unthriftiness, weakness, walk a few steps and sit down, inability to walk and finally death. The failure of the bone to properly calcify may be due to lack of sufficient calcium or phosphorus or to a lack of balance of calcium and phosphorus with an undue amount of calcium or of vitamin D. There are no lesions of the thoracic or abdominal organs.

Treatment—Vitamin D may be supplied in form of direct sunshine, cod liver oil, green feed or the ultra-violet lamp.

Coccidiosis

A protozoon disease affecting fowls, rarely at less than three weeks ago. It appears that the greatest loss takes place between the ages of three weeks and six months.

Symptoms—The chick is weak; feathers unkempt; wings droopy, due to muscular weakness; loss of appetite, or, in some cases, birds may continue to eat. The droppings are fluid and of a whitish or whitish brown color and paste up the vent. The discharges may be streaked with blood. In the older chicks the comb and wattles become pale. The adult fowl is less susceptible to coccidia infection, probably due to an immunity acquired by the ingestion of small numbers of oocysts.

In the adult fowl the disease usually assumes a far more chronic type. The fowl develops a gradual and progressive listlessness and loss of activity with emaciation. The comb becomes pale and the bird has periods of dejection during which it stands in an isolated position. Appetite may remain normal or may be ravenous when fowls are aroused at feeding time. Leg weaknesses and paralysis may accompany the disease. Emaciation becomes marked after a time, there is a persistent diarrhea with bloody droppings. Death may occur in from one to three weeks.

Mode of Spread—This protozoon is excreted in the feces, contaminating the soil, runs or floors, also the drinking water and food. The infection takes place through the digestive tract.

Control—One of the most important factors in the control of this condition is sanitation. This disease peculiarly lends itself to sanitary control due to the life cycle. If the chickens become infested with coccidia but once they will be rid of all the germs in 10 to 15 days. The organism does not continue to multiply in the intestines as many other infections do, but completes its cycle in a definite time and is passed out with the feces. Fresh droppings cannot produce the disease. The spores, which are the infective stage, are developed in the coccidia outside the body in 48 hours. Therefore, if by sanitation the cycle is broken at this point, the disease can be stopped.

Treatment—The use of acidophilus milk, dried milk powder, to the extent of 40% of the diet; catechu 1/3 teaspoonful to each gallon of drinking water, or ipecac in same proportion; quinine sulphate 1/3 grain; bichloride of mercury 1 to 10 thousand, or phenolsulphonates with bichloride have given satisfactory results in the treatment and control of this condition.

Entero-Hepatitis

A protozoon disease mostly in turkeys but does occur in chickens.

Period of Incubation—Usually from 10 to 12 days.

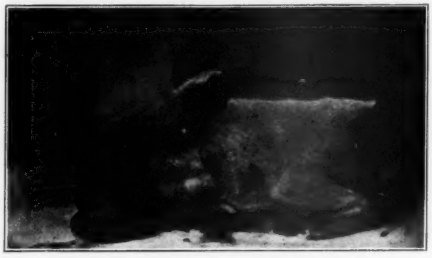
Symptoms—The first symptom noticed in the poults, which are the most susceptible, is a lagging behind the flock, a sign of weakness. This is followed by more pro-

nounced weakness as shown by the slow careful gait, drooping wings and a tendency to stand in one spot. Now follows a loss of appetite and also a loss of weight. No elevation in temperature. In adult birds, the symptoms are not manifest until the disease has progressed to a considerable extent. They appear dull, wings and tail droop, feathers ruffled and they sit around much of the time. Diarrhea of a greenish yellow color sets in, followed by loss of appetite, and the bird gradually grows weaker and usually dies in from three to ten days after appearance of the first symptoms.

Mode of Spread—The protozoon escapes from ulcers in the ceca and passes out with the droppings to contaminate the soil, food and water. This contaminated food and water is the means of transmission. The infection usually takes place in the ceca, then extends to the liver, causing inflammation and degeneration of these organs.

Turkeys of all ages are susceptible to blackhead but the young suffer most. Cases seldom appear before the 13th day. The most critical period begins at about the thirty-fifth day after hatching.

Treatment—In this condition, as in coccidiosis, sanitary control measures are all important. Do not allow young poults to run with older turkeys or chickens as there may be chronic carriers among the adult birds. On premises where chickens and turkeys have ranged for some time, it is advisable to yard the young birds. This should be done on non-infected soil if possible, otherwise cover the yard with about 9 to 12 inches of gravel.



Prolapse of the Intestine in a female dog. The prolapse occurred through a rupture of the Vaginal Wall, the result of mating to a dog of twice her size.—A. K. Gomez

Sulphocarbolates with bichloride of mercury give good results. The bichloride should be in a dilution of 1 to 20 thousand.

Hypodermic injections of tryparsamid, an arsenical compound, have been successfully used, the dose being 1 gram per kilo gram of live weight.

FACILITATES TURNING A FETAL CALF

In cases of dystocia when a cow is down and refuses to rise, we occasionally find one where it is impossible to keep the calf repelled long enough to turn a head or arrange the legs for normal delivery. In such cases, it is of great advantage to elevate hind parts of the dam. The usual method of merely raising hind parts two or three feet is often not sufficient, but suspending the animal by ropes around the hocks in an almost vertical position gives a tremendous advantage from gravitation of fetus. Two turns of the rope and a half twitch on each hock gives a good grip without hurting the leg.

F. G. Steinbach.

Wildwood Crest, New Jersey.

DROPPED EAR IN A DOG

A German Shepherd was brought to me with the upper third of his left ear hanging down. The owner would like to have this condition corrected if possible. My canine practice in this prairie province is quite limited and so is my practical experience with dogs. I recall, however, having seen a congenital maxilla deformity treated successfully with paraffin injections many years ago in Leipzig, Germany. Would it be worth while to attempt something of that order in my present case? I should appreciate it very much indeed if you would give me your opinion and advice.—C. G., Alberta.

Reply: Cases of this type are the ones that I like to leave strictly alone. The percentage of dissatisfaction that arises from meddling with such cases is far too great for comfort. The results in most cases do not justify the worry and bother. To let someone else treat such cases offers the best prospect for retaining the friendship of the owner of the dog.—J. G. H.

THE EVOLUTION OF VETERINARY INSTRUMENTS

Whatever field of veterinary science a veterinarian may choose to enter, he must needs have instruments to carry on his specialized work. The veterinary instrument maker, therefore, enters into a significant relationship to the veterinary profession.

In commemoration of the 75th anniversary of the founding of the well known veterinary instrument firm, H. Hauptner, Berlin and Solingen, Germany, W. Rieck,[1] Professor of Veterinary History at the Berlin Veterinary College, has written an interesting monograph on veterinary instruments in which he traced their evolution from the crude knife and the primitive phlebotome used at the dawn of veterinary history, through the centuries of progress, moderate and slow at times, at other times rapid and marvelous, up to the model instruments of the present day.

As this panoramic account passes in review before the reader, the ancient veterinary writers, Apsyrtus, Chiron, Columella, Pelagonius, Vegetius and others, excite our admiration by the surgical skill they possessed and for the high level to which they raised the veterinary art in the days of the Roman Empire.

Of the description of the medieval period, the reproductions of the aquarell illustrations from the Spanish manuscript of Juan Alvares de Salamiella, illustrating various operations, deserve special mention, as being of great historical interest.

Those able to read German are offered a rare intellectual enjoyment in the pages of this well illustrated and charmingly written historical sketch. In this connection it may be worthwhile to call attention to the anomaly that veterinary history is not taught at any of the American veterinary colleges; presumably from the mistaken notion that the veterinary profession in this country has no past. While it is true that veterinary history here is still in the making, nevertheless, the veterinary profession of North America has a glorious past of which it justly may be proud. At the present time, when the sentiment is for lengthening the veterinary curriculum to provide for broader cultural training of veterinary students, the inclusion of a lecture course on veterinary history may well be given serious thought by those in charge of veterinary education.

[1] Das Veterinär-Instrumentarium im Wandel der Zeiten und seine Förderung durch die Instrumenten-Fabrik H. Hauptner. (The Veterinary instruments, past and present, and their furtherance through the instrument firm H. Hauptner.) By Dr. W. Rieck, Tierarzt und Arzt, Privatdozent an der Tierärztl. Hochschule zu Berlin. Reprint from the anniversary catalog of the firm H. Hauptner, Berlin, 1932, pp. 116.—Abstract by F. Volkmar, Columbus, Ohio.

CAUSES OF MORTALITY IN POULTRY[2]

Of more than 2,000 chickens autopsied at the pathological institute of the Berlin Veterinary College 1924 to 1928, Dobberstein found that 9% had died from diseases of the oviduct, 17.5% from fowl-cholera, 10% from leucemia, 8.8% from tuberculosis, 5.7% from diphtheria, 5.3% from parasites.

Schürman found in Berlin and vicinity the following numbers to represent the incidence of disease as revealed by necropsy; diseases of the oviduct and peritoneum 12.67%, leucemia 12%, fowl-cholera 9.79%, diphtheria 6.36%, tuberculosis 6.79%, pullorum disease 46.84% of the baby chicks examined, coccidiosis 18.25%.

The following percentages were found in autopsies of 1,740 chickens at the clinic for small animals at the Berlin Veterinary College: fowl-diphtheria and fowl-pox 22%, diseases of the oviduct 12%, fowl-cholera 6%, tuberculosis 4%.

The further observation has been made on 553 chickens that certain diseases show seasonal variations. In tuberculosis for instance, no casualties occurred during September and October; in November the percentage reached nearly 10% and rose to 40% by February, when it declined again, reaching a low of 10% during June. In diseases of the ovary and oviduct, a rise in the incidence of the disease was noted with the beginning of the laying activity in December, reaching its peak in March and a second

[2] Ueber die Bekämpfung der wichtigsten Hühnerkrankheiten in Deutschland. (Control of the more important poultry diseases in Germany.) (From the Clinic of small domestic animals, Veterinary College, Berlin, Director: Prof. Dr. Hinz.) By Dr. H. Schröder, Privatdozent, Berlin.—Abstract by F. Volkmar, Columbus, Ohio.

peak during July. Fowl-diphtheria had its greatest frequency in November and during the winter months; fowl-cholera from September to November. The maximum amount of pullorum disease occurred in May, of coccidiosis in June and August. The various parasitisms occurred most frequently during July and August.

The following observations have been made regarding the diseases just discussed: In fowl-pox and fowl-diphtheria, the main damage is caused by the loss of condition and by the discontinuation of egg-laying. Vaccination in connection with other hygienic measures has proved an effective means of controlling and preventing this disease. Vaccination protection occurs within 14 days and lasts up to one year. The most opportune time for vaccination is July and August. Another hygienic measure of demonstrated value, is the use of a 3% aqueous solution of "sulfoliquid" for drinking water, and the separation of the healthy from the diseased chickens.

Fowl-cholera may reach a mortality of 90% and more. It occurs with special frequency among small poultry farms. Vaccination with a high-valent immune serum gives better results than drug therapy. The emergency vaccination (serum) has often saved many animals. Protection lasts only from 8 to 14 days. Vaccination should, therefore, be repeated after this time. Sanitary police regulations have proved efficient in preventing the importation of fowl-cholera from foreign countries. Seeding of the blood on sucrose-litmus agar and the observation of the wall formation phenomenon has become a valuable diagnostic aid.

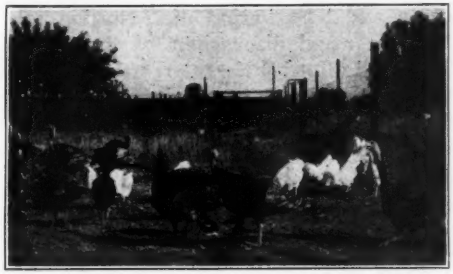
Tuberculosis has caused severe losses. It is said to have caused greater loss than any other disease. Tuberculin testing has given most encouraging results. The wattle test should be repeated after four weeks. Tuberculosis can be checked by providing new runs and by removal and replacement of the soil. Other proved prophylactic measures are the quarantine of newly purchased chickens and testing them with tuberculin. Beller and Henninger point out that massive and repeated infection are necessary to produce lesions.

The losses from leucemia are said to exceed those from tuberculosis. The causative agent is an ultravisible virus. Its control is very difficult. Clinical diagnosis is practically impossible. Treatment is of no value. A rational diet is recommended. Separation of healthy and diseased fowl and other hygienic measures will aid in the control of the disease.

Pullorum disease has caused great damage to German poultry breeders. The rapid agglutination method is recommended for diagnostic purposes. Chinosol solution 1:10,000, given as drinking water reduces losses 6.5%. Immunization with vaccine or serum failed. Reactor hens should be destroyed. The eggs of persistent carrier hens should not be used for hatching purpose. The manner of feeding plays a rôle too. Thus, highly concentrated feeds cause a disposition for intestinal disorders, upon the base of which pullorum disease develops.

Diseases of the ovary and oviduct are likewise often ushered in by dietetic errors. Avitaminoses play an important rôle in the incidence of diseases. Addition of the lacking vitamins to the diet, other corrections in the diet and light therapy have given good results. The feeding of chlorcalcium and vitamin D ("Vitakalk") has proved a reliable preventive of rickets and has contributed to the profit of chicken raising.

Finally the parasitoses are an important problem to deal with. Various treatments are discussed.



Turkeys should be kept isolated from chickens. Running them on the same range is harmful to both. The turkeys give the chickens gape worms and receive in exchange blackhead

Book Reviews

Veterinary Obstetrics and Zootechnics: By Howard N. Beeman, D. V. M., Major, Veterinary Corps, U. S. Army, Octave of 131 pages, no illustrations. Published by American Remount Association, Washington, D. C. Cloth, $2.50.

This concise little work of just over 100 text pages adheres closely to its objective of being a practical guide to the veterinary practitioner in serving the horse breeding industry. There is no discussion of breeding problems of animals other than the horse, and little discussion of the physiology or pathology of reproduction other than that incidental to the detailed descriptions of approved practices in handling the stallion and mare with a view to obtaining a maximum efficiency of the reproductive function.

The author has undertaken the rôle of reviewer of all the available literature on breeding of horses and interrogator of the veterinarians in the Blue Grass region of Kentucky who devote a major portion of their time to serving the leading horse nurseries of America. No originality is claimed except that of the motivating spirit and arrangement of the subject material. A fine discernment has been shown in the selection of matter for publication.

The first four chapters of the book, Anatomy of the Genital Organs of the Mare, Physiology of the Female Genitalia, The Fetal Membranes and the Placenta and The Period of Gestation follow the usual discussions of these subjects and afford little to arrest the attention of the reader possessing average information on the subject of veterinary obstetrics.

The remainder of the work is arranged on a different plan, follows a more engaging style and is more informative. The symptoms of approaching parturition, the act of parturition, the care of the new-born foal and of the parturient mare is taken up chronologically, step by step, and specific directions given for the attending veterinarian.

Little or no discussion is given of the reasons for the practices advocated. Possession of this knowledge on the part of the veterinarian seems to be assumed. The diseases of the new-born foal receive more extended discussion.

The directions for the care of the foaling mare and of the mare during the interim between foaling and breeding follows closely those given in publications of the Kentucky Agricultural Experiment Station.

Great stress is laid upon the importance of genital health in the mare at the time of breeding. Uterine infection occurring during the parturient period or at the time of breeding is regarded as by far the greatest obstacle to successful reproduction in the mare.

Directions for handling the mare and the stallion during the breeding season and at the time of copulation are specifically and concisely given. The discussion of the diagnosis of pregnancy and artificial insemination seems inadequate. Occasionally the meaning of the author is not clear. For example, under The Pathology of Sterility, we find:

"Cases of uterine infection invariably have in part the following histories: dystocia or imperfect parturition; injuries at the time of parturition; rupture of the vulvar sphincter muscle; retention of the fetal membrane; failing of prompt involution of the uterus following foaling; improper douching following parturition; dilation of the *os uteri* by attendants at time of service; unclean artificial impregnation; insanitary breeding conditions, including both surroundings and insanitary handling of the mare and stallion, and breeding mares which are harboring infection at the time of service."

It will be observed that the author makes no distinction in the foregoing between causes and results of infection, and

mixes them somewhat indiscriminately. Unless the reader of his own knowledge knows which are causes and which are effects, of course attempts at prevention will be futile.

Probably all or nearly all of the information given in this work is available elsewhere. Likely, practically all of it has appeared in one form or another in the pages of this magazine during the last half dozen years, but the author has rendered a valuable service in bringing these scattered discussions together in a single volume, in arranging them in logical sequence and condensing more or less voluminous discussions and reports into concise, specific directions logically arranged for the use of the practitioner in the breeding pens, in the maternity wards and in the nursery.

The Early History of Veterinary Literature and Its British Development: By Major-General Sir Frederick Smith, K. C. M. G., C. B., Fellow and Hon. Associate of the Royal College of Veterinary Surgeons, London. Vol. III, The Nineteenth Century, 1800-1923, 184 pages, illustrated. Published by Bailliere, Tindall & Cox, London, England. Cloth, 15 Shillings ($2.30) net.

Reviews of Volume I (published 1919) and II (published 1924) of this important veterinary work have previously appeared in these pages. The present volume, the third, presents a discussion of the veterinary literature of Great Britain from 1800 to 1823, inclusive.

The purpose of the author is succinctly stated in the following quotation from the introduction: "Throughout the volumes of this history the definite object kept in view has been the endeavor to trace the origin of our knowledge of the veterinary art—how and where it arose, and to whom we are indebted for it. To some this may seem a trifling quest, but to those who, realizing that nothing can be completely understood if its history is unknown, wish to learn the origin of things, it is far otherwise."

To many the present volume will be more interesting than either of its predecessors since it deals with writers, some of whose works have remained current in veterinary literature through reprints and new editions, down nearly to the present time and to which references frequently occur in current literature.

Most notable among such are the writings of James White, Wm. Percivall, Richard Lawrence, Wm. Sewell and Wm. Youatt, an American edition of the latter's work on The Horse having been published in 1843.

In this volume too for the first time, we come upon veterinary works written by men who were the beneficiaries of professional schooling and a decreasing number of works from writers whose training was wholly empirical. Consequent upon this, there is an astonishing improvement, or perhaps it is not astonishing under the circumstances, but actually a great improvement in the quality of the literature of this period over that of the preceding century.

This period marks the beginning of research, or the experimental method of obtaining information, in veterinary medicine. The writers of previous periods had accepted the "discoveries" in medicine as they found them without attempts to verify their accuracy. In this first quarter of the nineteenth century, we find men with scientific training making an effort to verify the statements that have been handed down to them; endeavoring to determine the infectiousness of disease by experimental inoculation; holding autopsies to learn the pathology back of the symptoms observed, and assembling statistics and other facts concerning the morbidity of animals and to determine the efficiency of the treatment employed. It was during this period that glanders, chronic nasal catarrh and strangles were first differentiated. We find iodine used in goitre, an equine operating table in use and the stomach tube regularly employed. We find trephining a recognized treatment for nasal catarrh and the first work (an excellent one by Youatt) on the diseases of the dog. Shoeing received

a great deal of attention from the writers of the period and was the subject of numberless acrimonious disputes.

Youatt, by the way, held that occasional cases of rabies in the dog recover, a view that was dropped for three-quarters of a century to be revived only lately, and at the present time, show prospects of general acceptance in the not distant future.

An additional volume of this history remains to be published, bringing it down to 1869. The manuscript for Volume IV was completed before the death of General Smith and measures for its publication are under way at the present time by the National Veterinary Medical Association of Great Britain. When the publication is completed, this History of Veterinary Literature will undoubtedly be accorded the premier place among the works of its distinguished author; to whom perhaps the veterinary profession of the English speaking world is under greater obligation than to any other writer that the profession has produced.

A Manual of External Parasites: By Henry Ellsworth Ewing, United States Bureau of Entomology, Washington, D. C. Octavo of 225 pages, profusely illustrated. Published by Charles C. Thomas, Springfield, Illinois. Cloth, $4.50.

In this manual of ectoparasites an attempt has been made to give a background for the study of the different groups. Keys in most instances have been given to the known genera of the world; and in addition supplementary taxonomic matter has been added, together with some consideration of the external anatomy, life histories, natural relationships and economy. Treatment has been confined entirely to the five major groups of ectoparasites; the mites, the ticks, the biting lice, the sucking lice and the fleas.

This is mainly a discussion of certain external parasites as such—their genus and family relationships, their structure and keys for classification and identification. Their economic importance, the diseases they cause, the means of prevention and treatment comes not within its purview or is but slightly touched upon. The discussion is not limited to parasites of man and domestic animals, but includes parasites of all animals both land and aquatic. It will prove useful for veterinarians wishing to pursue the study of mites, ticks, lice and fleas somewhat further than can be done with available works on veterinary parsitology.

The University of Giessen (Germany), at its recent commemoration of the 100th anniversary or its right to confer the degree "Doctor med. vet." conferred the honorary degree of Doctor med. vet. upon Doctor Theobald Smith of the Rockefeller Foundation, Princeton, N. J. The degree reads: "To the pioneer investigator and tireless research worker in microbiology, to whom veterinary science owes fundamental scientific achievements . . . the conqueror of Texas fever."

THE FIRST CAVALRY GIVES REVIEW FOR ITS HORSES

A regiment of cavalry marching afoot in review before its horses; the horses "taking the review," happened at Fort D. A. Russell, Marfa, Texas, recently. It is one of the most unique and dramatic occurrences in military annals.

It was not a funny stunt.

It was a pathetic farewell of a regiment to its horses. The First Cavalry is being mechanized.

The brilliancy of all former reviews of the First Cavalry was eclipsed when the entire regiment, including all officers and enlisted men, passed in review before their mounts.

Picket lines were strung and the mounts tied to the lines. Colonel Austin in command, and the entire regiment, on foot, led by the famous Black Hawk Band, passed in review before their horses.

As each troop passed the picket line, the order was given for the salute, the regiment using the famous Facist salute.

As troop by troop marched by, the "four-footed" soldiers sensed the unusual. Their ears pricked up when they witnessed their masters passing in review.

"Old Louie" the oldest horse in the regiment from the standpoint of service, took the review for the remainder of the horses.

Men and officers realized as never before that the First Cavalry, the oldest in the American Army, was bidding farewell to the mounted service and that "Boots and Saddles" would never be sounded again for the majority of them, that the memories and traditions of the famous Black Hawk Regiment would be all that could be retained.

The cavalry uniform is to be changed and the proud name of "Black Hawks" perhaps changed to that of "The First Mechanized Regiment." Orders have been issued for the distribution of the horses to other posts.

H. S. Hunter.